The Builder.

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Architectural Engineering.

NO apology is necessary for the introduction of this subject to our readers, for the growth of engineering methods in modern architectural practice is too marked to escape attention. By early training architects are led to think in stone. In the future they may be obliged to think in steel, not exclusively, but to a considerable extent; they must at all events study the practical qualities of steel, and the principles underlying its application, to a much greater extent than they have hitherto done. In the United States the point has already been reached, rendering necessary a system of architecture harmonising with the work of the constructional engineer; and until such a system has been satisfactorily developed it is very unlikely that buildings of the American type will ever be acclimatised in this country. Details of construction stand on a different basis, and many of them may be adopted with advantage, especially those relating to fire-resisting design. It is therefore with interest that we open the pages of a book containing practical and comprehensive data on the subject of steel building construction in the United States.*

The author, Mr. Freitag, may be remembered by our readers in connexion with a previous work on "The Fireproofing of Steel Buildings," which was reviewed by us in 1900, and his present object is to illustrate such of the fundamental principles involved in the construction of modern buildings as may prove useful to architects, engineers, and students. Since the first edition was published so much additional information has become available that revision seemed to be necessary, and the opportunity has been taken of including descriptive accounts of newer buildings than those pointed to in the original edition. The intimate relationship between fireproofing and steel construction has tempted the author to include a good deal of matter already contained in his treatise on the former subject. Therefore, we do not propose to refer to fireproofing methods, except so far as they may directly affect matters appertaining to design.

At the outset it must be said that the title chosen suggests much more ground than is covered by the treatise, the scope of which is limited to a consideration of the problems ordinarily met with in the modern office building, as exemplified in American practice. A complete exposition of the subject implied by the title would properly cover every form of building construction and all varieties of building materials. One of the chief objects of Mr. Freitag's book is to assist those who are engaged in constructive building design to make themselves still better acquainted with the practical details of their art. The first chapter, mainly devoted to a historical account of iron construction and the development of "skeleton" and "cage" construction, needs no comment, and we therefore pass on to Chapter III., wherein the author describes and illustrates a few typical American buildings. The illustrations serve to make clear two distinctive features of such structures; hopeless disproportion of the exterior, and admirable arrangement of the interior. Chicago furnishes the greater number of the examples given. Of these the Stock Exchange building is a dreary waste of windows surmounted by an oppressive cornice, and supported by a base combining the three lower floors in a series of arches, in the middle of which there is an inharmonious doorway on a scale rather suggesting the entrance to a beehive. The Marquette building merely resembles a high factory with no pretension to anything but ugliness, and it is, therefore, moderately satisfactory. A somewhat similar characteristic is found in the Reliance building, a tall tower of rectangular windows, standing on a shop. The Masonic Temple is a huge agglomeration of atomic details, whose bewildering profusion the architects have endeavoured to minimise by the aid of various architectural devices. Much more effective is the simpler form of the Monadnock building and the tasteful style of the New York Life Insurance building, Chicago. There is a very clear attempt to convey the idea of massive unity in the Old Colony building, by adopting the plan of a keep with flanking towers of circular form, although excessive height and too many windows spoil the general effect. Only one example of Bostonian architecture is illustrated by the author, a kind of two-storied carriage-builder's shop of airy construction, carrying what purports to be a massive and rather handsome stone building, with a heavily decorated top and an overpowering cornice richly adorned with wedding-cake ornaments. The greatest monstrosity of all is to be found in the Park-row building, reaching the height of 390 ft. above the street level, and interesting merely as a piece of clever engineering work. Broadway Chambers is an oblong tower, of which the base would serve very well for the support of a decently designed superstructure, the shaft would make an excellent dock warehouse, and the capital might be considered a tasteful pavilion if brought down from the skies and placed amid harmonious surroundings. The Gillender building is certainly a weird incongruity, consisting of an ordinary nineteenth-century house on the top of which a classic temple has been deposited, apparently by accident. The general effect is to remind one of the perilous structures erected by a child when determined to test the complete resources of a new box of building blocks. Judging by the examples given by Mr. Freitag, it must be inferred that American architects have not yet succeeded in finding garments appropriate to the latest production of the steel house-builder. Nevertheless, when ordinary limits of height are not exceeded it is quite possible to obtain pleasing effects, as evidenced by various buildings in New York and elsewhere, but not illustrated by the author.

So much is heard in these days of steel

* "Architectural Engineering, with especial reference to High Building Construction." By Joseph Kendall Freitag, B.S., C.E. Second Edition, rewritten. New, York: John Wiley & Sons. London: Chapman & Hall, Ltd. 1901.

construction in the United States that it is worthy of record that American architects are not universally in favour of the practice. Mr. Freitag mentions that considerable divergence of opinion was shown in an interesting discussion on the subject before the American Institute of Architects, and that the Supervising Architect of the Treasury was reluctant to consider seriously such construction as worthy the dignity and solidity of Government edifices—notably in the new Post Office building for Chicago. On the question of erection the author has some interesting facts to present. Rapidity of construction appears to be an essential factor, and some form of tower or travelling derrick is generally used on large buildings. In some cases special steam cranes are employed, such cranes running on tracks laid over the floor system and pulling themselves up inclines from story to story as the building progresses. The crane-boom and engine-platform revolve on a pivot, so that beams and columns are handled with very little trouble. The form of tower derrick described by the author is clearly calculated to save an immense amount of time and labour. Whenever possible it is arranged to move from end to end of a building, and at the same time to reach out on either hand to the side walls. Frequently it is supplemented by a distributing car running on a narrow-gauge track of light rails. As exemplifying the usefulness of such a contrivance, the author mentions the Siegel - Cooper building, where seven complete tiers, aggregating between 7,000 and 8,000 tons, were erected in nine weeks' actual working time by the aid of travelling derricks of the kind mentioned. In this case, he says, two travellers were installed on opposite sides of the same floor, and a gang of twenty men, with each derrick, were able to erect twenty bays of ironwork in a day, each bay being about 24 ft square. While the average rate of setting steel frames is given at about two tiers of beams per week of six working days of ten hours each, the rate is often much higher. In the case of the Fisher building, Chicago, an example given by Mr. Freitag, the entire steel skeleton above the first floor was erected in twenty-six days without overtime or night-work. As this building includes nineteen stories and an attic, the record may possibly be useful to some of our readers. Some photographs reproduced in the work before us serve to convey a very striking impression of rapid work. To take a pair of these, relating to the Broadway Chambers, New York—the first, taken November 9, 1899, shows four tiers of beams in position and the projecting ends of some columns, and the second, taken on December 21, 1899, shows the building at the height of eighteen stories, the granite walls being completed up to the third floor, and brick walls thence to the eleventh floor, while four concrete floors appear to be laid above that level. Rapidity of erection is, of course, greatly facilitated by the "veneer" type of wall construction, as work can progress at different stories simultaneously. Thus, in the Unity building, the granite base wall of the first and second stories, the brick wall at the twelfth floor, and the hollow-tile arches of the fifteenth floor were all in hand at the same time. The following table is sufficiently demonstrative of the short time in which a huge building can be completed, the case being that of the New York Life building, Chicago, in which there were 671 individual columns :—

July 17. Old building torn down to grade.
July 31. Laid out new footings.
August 17. Started setting basement columns.
August 31. Started laying granite.
September 5 Started setting tile arches.
September 18. Started laying terra cotta facing.
September 29. All steel set.
November 9. Tile floors all set.
November 11. Terra cotta all set.
November 12 Started plaster.
December 2. Steam plant completed.

It must not be supposed that the steel members are "thrown together," for, as Mr. Freitag tells us, careful work prevails throughout. Column bases are carefully aligned, and only a very thin layer of grouting is allowed between the column pedestal and the masonry bed of the foundation. Cap stones are brought to the most accurate bed possible, with grouting as a thin cement, and not as a leveller. Riveting and punching of the steel members is done as far as possible at the contractor's yard, where also the facing of column ends and of all contact bearing surfaces is performed. Beams and girders are first temporarily bolted by the erectors, who are speedily followed by the field-riveting gang. Bolted connexions are now discarded, because of the cracks caused in plastered ceilings consequent on their use. Column joints, or "splices," are made from 1 ft. to 2 ft. above the floor level, so that the floor beams, resting on brackets near the tops of the columns, may act as braces during erection. All steel is carefully painted after erection, partly so that rust may not be formed on the surface before concrete or other casing is applied, and partly because it is difficult in building work to guarantee a perfect union between cement mortar and metal-work at all points. On the subject of permanence Mr. Freitag mentions a good many facts that are worthy of careful perusal. He shows that the effect of lime upon steel seems to depend very largely upon the peculiar conditions of each case, and comes to the correct conclusion that lime mortar should not be used in any place where moisture is to be anticipated. Considering the low cost of cement in the present day, it certainly seems wise to use this material for the protection of all metal-work, especially as it is also an excellent fire-resisting medium. Some useful notes on painting and paints are to be found at the close of the chapter dealing with the general aspects of the subject now brought forward by Mr. Freitag.

We pass over the detailed descriptions of floors contained in Chapter IV., because they are practically the same as those mentioned in the work on fireproof construction. When discussing live floor loads, the author cites figures tending to show that the requirements of the New York, Chicago, and Boston building laws are too high for dwellings and office buildings, and he suggests that much lower figures should be used for proportioning the metal work, while still using the specified loads in considering the floor arches singly. On the whole, we are inclined to agree with the municipal regulations, which allow a margin for contingencies, and ensure rigidity. Dead loads are, of course, calculated in the usual way, but in skeleton construction the weight of partitions must also be included, as these are carried by the floor beams, and their position is constantly being changed to suit the convenience of tenants, a varying factor that does not occur in this country. Several plans are given in this chapter illustrating typical floor framing in some of the New York and Chicago buildings previously mentioned. A useful paragraph is one pointing out the desirability of arranging a floor plan so that the most economical sections may be employed in girders and beams. Economy can only be attained when the steel is strained to the maximum allowable fibre strain, and if the plan is settled finally in the first instance, without considering alternative steel sections, it will very often happen that girders and joists must be selected giving a considerable excess of strength. Hence we see the necessity of familiarity on the part of the architect with steel construction, as a very small variation of the original arrangement may often save absolutely unnecessary expense.

Another point mentioned by the author, is the inevitable waste of material always occurring towards the ends of heavy rolled beams, where bending moments are at the minimum. Hence, depth should be preferred to weight when beams are being chosen from a section book. It appears that architects in America are frequently content to specify the sizes and weights of the materials to be used, leaving the details of construction to be worked out by the contractor. This is a system upon which we have more than once commented, and we are glad to read in Mr. Freitag's book that "the experienced architect or engineer is not usually satisfied with such license on the part of the contractor." The best class of work can only be ensured when all details have been settled after careful consideration of all the conditions involved, and in our opinion the designer is the only person qualified to appreciate such conditions at their true value. Small details may be left to the contractor, but not the main features of any scheme.

The most essential difference between our own buildings and those now under consideration lies in the treatment of the walls. In this country the common theory is that the walls of a building carry the whole weight, but a frequent practice is that they carry a comparatively small portion of it. Architectural practice has outgrown the London building regulations, but at the present time there seems to be no promise that they will be altered to suit modern conditions. Consequently various anomalies occur and solemn fictions are maintained. It is quite common to find the whole front of a business establishment carried upon a steel girder supported by steel columns, but if, instead of fixing fragile glass windows, an architect were to build a 9 in. brick wall beneath the girder, it would promptly be disallowed. We remember a case that occurred only a few months ago in London, where an architect proposed to build a curtain wall of 9 in. work between two tiers of steelwork. Although absolutely no weight could come upon the new brickwork, the authorities required it to be not less than 14 in. thick, so as to comply with the rules! American building laws are of more elastic nature, providing for safety, yet leaving the architect to choose what type of building he will erect. "Load - supporting" walls are still built in the United States, and they must be of ample thickness. For instance,

a building carried to the height of sixteen stories would have walls at least 6 ft. thick at the street level. This form of wall is not popular for office buildings in large American cities, because valuable renting space would be sacrificed, and for very high buildings the space occupied by piers would interfere with light, while the weight would add so much to the load per square foot on compressible foundations as to render practically impossible many of the buildings that are required by the public. "Self-supporting" walls are also adopted, in which metal columns carry the tributary floor loads and the roof loads, while the walls support themselves and the spandrels only. In this method, it is important that the masonry shall not touch the columns, or unequal settlement of the two materials will inevitably cause undesirable strains. As the author pointed out in his introductory chapter, the earlier examples of so-called skeleton construction embodied self-supporting walls, but the objections of size and weight led to the adoption of what is termed "veneer construction" walls. As an extreme example of a high building with self-sustaining walls the author mentions the *World* Building, New York, in which the walls (of sandstone, brick, and terra-cotta) increase in thickness from 2 ft. at the top to 11 ft. 2 in. near the bottom, and are then offset to a concrete footing 15 ft. wide. The structure in question is 191 ft. to the main roof, above which is a dome containing six stories—in all a height of 275 ft. above the street. We do not want such buildings in this country, but as the Americans do require them, a lighter type of construction has its advantages. Veneer construction does away with all masonry except as an envelope for the steel frame and for filling spaces below the windows. To use Mr. Freitag's words, "The brick wall, once the fundamental factor in building construction, now fulfills simply a decorative and protective function." As stone does not afford adequate protection against fire it is chiefly used in American buildings for effect, while terra-cotta and brick, which are unsurpassed as fire-resisting materials, are very largely employed. The details concerning exterior walls in this chapter, and those relating to spandrels, spandrel sections, and bay windows in the succeeding chapter will repay examination, and their value is much enhanced by the numerous illustrative sections given by Mr. Freitag.

In Chapter VII. the author endeavours to investigate the more important forms of columns, and to point out the advantages and disadvantages of each one. The inquiry is upon a most interesting subject, and one that is of extreme importance, but the limits of space will not permit us to follow the author in his task. As might be expected, he characterises the use of cast iron in large buildings as a thing of the past among progressive designers, and passes on to illustrate the great variety of steel sections available to the designer of columns and stanchions. The main essentials of column design are very fairly stated by Mr. Freitag. Cost is largely governed by the form of section, and in the case of built-up columns by the amount of workmanship necessary for the production of the form. A hollow section requiring no riveting, and having a uniform radius of gyration in every direction would be theoretically the most economical for use, if it were not for practical considerations. Columns must be of such design as to lend themselves to ready splicing, and it is of much importance that girders and beams should be attached in such manner as to transfer the loads to the centre of the columns. So it may well be that a form of section that is theoretically the strongest and the cheapest will be found neither one nor the other in practice. Taking all things into account, it is found that practical and theoretical conditions are most nearly balanced by the use of rectangular columns, such as those built of Z-bars, or of plates and angles, or plates and channels. Fireproof material can be applied to almost any form of section, but the space necessarily existing between the column and its covering has tempted American engineers to run pipes therein. This is a practice that cannot be recommended, and we are pleased to find it discouraged by the author. Pipes ought not to leak, but they sometimes do, and it is a serious mistake to expose steelwork to any risk of oxidising influences. Moreover, pipes ought always to be run in conduits where they can be inspected or repaired at any time.

Probably the heaviest column section ever used in building construction is that to be found in the Waldorf-Astoria Hotel, and it was required for supporting the giant trusses which we briefly described in January, 1901. A section of the column is given by the author, by which it is seen that to obtain the necessary area, ten web-plates, four covers, and twelve angles were used. The load carried was estimated at 5,400,000 lbs., and the weight of the column was 46,980 lbs. Three or four other sections are also given of other large columns, which will be of interest to architects. Three paragraphs dealing with column bases and shoes are of considerable value, and so also are those relating to column loads, sizes, details and splices, and fireproofing. It is satisfactory to notice that Mr. Freitag calls attention to the necessity for considering the effects of eccentric loading, [a subject to which we have recently adverted in our columns. Wind bracing is a subject that scarcely concerns the British architect, and even in the United States it is considered that wind bracing is unnecessary when brick partitions are incorporated with a well-constructed steel frame. In veneer buildings, however, wind bracing is an essential, especially in view of the tornadoes afflicting some parts of America. Our readers should find the examples given of sway, portal, knee, and lattice bracing useful for the purpose of showing how wind pressure may best be resisted. Lattice girders are not largely used in this country by architects, and a short time ago one of our engineering contemporaries made the remark that such girders were never employed in building construction. We may therefore direct special attention to the examples of lattice girders described and to the illustration of the Park-row Building, where twelve stories will be seen to incorporate this form of detail.

As may be gathered from our review, the object of the author has been to start with the load-bearing floor system and to lead down through columns to the foundations, wind bracing being treated as a part of the column design. We come now to the subject of foundations, which is of even more importance to the American than to the British architect, because the former has to distribute enormous concentrated column loads over his site, and at the same time to avoid interference with basement space where mechanical plant is usually "located." The more equable distribution of weight through the walls of buildings as erected in this country does not as a rule call for the special methods necessary in America. In practice, it is found that by the adoption of steel footings, and the distribution of concentrated column loads over the available ground area, the weight of a structure, and consequently its weight, can go on increasing until the footings cover the entire area, within permissible limits. These limits are soon reached with buildings having self-supporting and load-supporting walls, and resting upon ordinary foundations, but the development of skeleton and veneer construction, and of the newer foundation methods render possible the structures which are looked upon in this country as monstrosities. In Chicago, the limit of height has probably been reached, but in New York City the character of the rock foundations and the absence of restriction as to height seems to render possible the erection of buildings even more lofty than those already perpetrated. From the chapter of foundations, it is clear that the municipal authorities of most large American cities are careful that safe limits of bearing pressure shall not be exceeded. Differences in the character of the soil render necessary very different treatment. Thus, in Chicago surface foundations predominate; in Boston, piles are largely used; and in New York, pneumatic foundations to the bed rock are generally found. All these types of foundation are described clearly by the author, and much useful information is given as to the requirements of building laws, and the pressures due to buildings in the chief cities. The chapter on this subject is of considerable length, and is perhaps the most valuable in the whole volume, its usefulness being augmented by the plans and sections illustrating the text. The concluding chapter is occupied by suggestions relative to specifications as to character of materials and workmanship and inspection. Many serviceable hints may be derived from a careful study of this chapter, which is a worthy conclusion to a thoroughly conscientious and interesting volume. Mr. Freitag is largely descriptive, yet he does not anywhere forget the importance of practical detail. In some chapters he purposely omits particulars that may be more conveniently obtained from the section books published by steel manufacturers in the United States, and although he gives some formulas for calculating the strength of beams and columns, his book nowhere assumes the character of a mathematical treatise, and may be read through without the accompaniment of pencil and paper for the purpose of interpretation. For some reasons this is an advantage, as those who wish to work out problems suggested can readily do so by the aid of knowledge already acquired, or to be obtained from any of the available text-books on constructional work.

VICTORIA MEMORIAL, MASHONALAND.—Mashonaland's memorial to Queen Victoria consists of a public library and museum and an assembly-hall, to be erected in Salisbury.

NOTES.

Architectural Competitions.

THE following proposed additions to the Institute "Suggestions for Architectural Competitions" are down for consideration at the business meeting of the Institute on Monday next :—

"The following paragraph to be inserted in Clause 1 :—

The selection of an assessor should be made with the greatest possible care, as the successful result of the competition will depend very largely upon his experience and ability.

Clause 4 to be amended so as to read as follows :—

4. The number, scale, and method of finishing of the required drawings should be distinctly set forth, and they should not be more in number, or to a larger scale, than necessary to clearly explain the design. If the assessor advises that perspective drawings are desirable it should be so stated, and such drawings should be uniform in size, number, mode of colouring, mounting, or framing (if any), &c.

The following to be added to Clause 12 :—

It is important that the award of the assessor should be adhered to unless there is some valid objection to the employment of the author of the selected design to carry out the work, as to which the assessor is satisfied. The setting aside of the assessor's award for any other reason constitutes a breach of faith on the part of the promoters."

The first of these propositions is of the kind called "self-evident." The second we entirely approve of, but the difficulty is to get competition committees to consult the assessor in drawing up the conditions, as in many cases they seem to consider it only necessary to seek his assistance in making the selection. The third is open to some comment. It is not wise to attempt to tie down those who are to pay for and use a building to accepting unconditionally the choice of a person not practically interested in the matter. The public are likely to kick against that; and assessors are not, any more than other mortals, infallible. We think that in all cases the committee should bind themselves to award the premiums according to the assessor's judgment; and in general they will be wise to carry out the building to which he gives the first premium. But if, where there are three premiums (as is generally the case), they prefer to carry out the second or third premiated design rather than the first, they ought not to be regarded as breaking faith with the competitors on that account. It is they who are to live in or make use of the building, and they may have good reasons for preferring the second or third to the first premiated design. It ought to be sufficient if they undertake to select one of the premiated designs for execution, though they may very well be advised that they will in most cases be doing best for themselves in taking what the assessor thinks the best plan. Eminent architects who act as assessors are, however, sometimes too apt to choose a design for artistic merit rather than convenience of plan; it should not be so, but it sometimes is. Another point that should be noted is that competing architects are too much inclined to think that the assessor has no duty except to the competitors. They forget that he has a duty to the committee as well.

Local Expenditure.

THE motion of Mr. Balfour, agreed to in the House of Commons without discussion, to appoint a Select Committee to inquire whether any analysis of the public expenditure is possible which will not also involve criticism of the Government's policy, hardly seems likely to produce any satisfactory results, as the questions of national policy and national expenditure are indissolubly connected. The really important subject for inquiry seems to us rather to be the serious increase in local expenditure, and this could be the subject of investigation without any such limitation. The same public attention is not given to local expenditure which is directed to public expenditure; a small increase in the National Debt calls forth a strong remonstrance from the Opposition, yet the local debts roll silently up until we are confronted with an increase of some 183,000,000*l.* in the period between the years 1875 and 1899. The question is a serious one, not only to householders, but to holders of property generally, and as evidence of this the reports of the principal railway and other companies can be referred to, in which the large increases of local taxation are mentioned, and the complaint is put forward that a large portion of this increase is necessitated to enable Municipal Authorities to carry on undertakings of a commercial character in competition with those who have to bear the taxation. An investigation into the cause and character of the local expenditure, how far it has been productive, and how far the increase is justified, would be of considerable use, and public attention should also be drawn to the question whether it is politic for Municipal Authorities to engage in undertakings of a commercial character in competition with private enterprise.

The Efficiency of Glow Lamps.

MR. WEISSMANN, in a paper read at a recent meeting of the Société Française de Physique, described a novel system of electric lighting whereby consumers may effect considerable economies in their meter bills. It is well known that the practical efficiency of glow lamps varies from 3.5 watts per candle for a 100-volt 32 c.-p. lamp to 5 watts per candle for a 5 c.-p. lamp. For lamps at higher pressures the efficiences are considerably smaller. Now, Mr. Weissmann proposes to vary the pressure on the lamps with their candle-power, so that all lamps used may have carbon filaments of the same thickness. He has constructed lamps of 16 c.-p. at 22 volts which take only 1·7 watts per candle when first put in circuit, and after 400 hours still consume less than 2 watts per candle. They, therefore, provide the same light as ordinary lamps at less than half the price. He points out that small transformers can now be made which can easily go in the base of a lamp-fitting, and their efficiency can be guaranteed to be over 85 per cent., and is sometimes as high as 96 per cent. Hence, taking the data given as correct—and we see no reason for doubting them—an economy of about 40 per cent. can be effected by this means. Instead of using one transformer for each lamp, transformers may be used to supply a group of lamps, and so the wiring for them need not be complicated. Fifty candle-power lamps will be run at 110 volts, and ten candle-power lamps at 22 volts. Unfortunately this system cannot be very easily applied to direct current circuits, but there are many cases where it is possible to run several low voltage lamps in series on a high pressure direct current circuit with advantage. There is such a large difference between the cost of light from a high pressure and from a low-pressure lamp that it will well repay electricians to devise methods of utilising the latter in circuits where the pressure of supply is from 200 to 250 volts.

Silent Chain Gear.

WHILE its mechanical advantages are well known, the employment of chain gearing is often thought to be impracticable because of the noise connected with its use, and because of the low speeds usually necessary. The increasing application of electric motors and machinery of various kinds in public and other buildings frequently presents for solution the problem of transmitting power for short distances without undue loss and noise. Sometimes the limits of space may not permit the installation of a direct-connected engine and dynamo, nor give the necessary distance from one machine to the other for belt driving. Ordinary chain suffers from the faults named, and belting would slip. Moreover, when an ordinary chain gear is started, the pins bed in their bearings, the material is stretched, and wear of pins and bearings begins. At the same time, the root diameter of the sprocket-wheel is decreased by wear, and presently the pitch of the chain becomes too great for that of the wheel, so that one tooth may ultimately have to do all the work at any given moment. Then, when one link has left a tooth, the wheel moves back under the load and the tooth strikes against the next pin of the chain causing noise and shock, the latter straining both wheel and chain, and consuming power. In the Renold silent chain gear these disadvantages appear to have been avoided, for the wheel and chain remain a perfect fit each with the other independent of the stretch of the chain. This chain gear has links of peculiar form, bearing on the faces of the teeth, instead of on the root circle, and every tooth in gear remains in equal contact with the chain irrespective of stretch. As there can be no slipping back of the wheel there is little if any noise, and as the strains limiting the speed of ordinary chains do not exist, the gear may be run at high speeds. A self-adjusting chain of the kind must be invaluable when two or more chains have to be run on one wheel, and the life of the chain is the time which it may take to stretch so much that it ceases to bear on the teeth of the wheel.

Sanitary Condition of Darwen.

DR. S. W. WHEATON'S Report to the Local Government Board on the prevalence of diphtheria in the Borough of Darwen, lays stress principally on bad and imperfect sewerage, and on the existence of the pail-closet system. He states, in regard to sewerage, that there is no plan in existence showing the whole of the sewers of the town, with details as to their construction, fall, connexions, and other needful particulars. In many instances sewers have been laid, or extended, without due supervision, so that the advantages accruing from a good fall have been neutralised, and from faulty surveying some of the sewers have been laid without sufficient fall, so that sewage remains in them in an almost stagnant condition. There is no ventilation of the sewers except what is effected by a

few gratings placed over catchpits or manholes. There are a large number of sewers with dead ends which are unventilated. There are several extensive areas in the town in which the dwellings are sewered by a number of small unventilated branch sewers ending in dead ends and falling into a main sewer which is also unventilated. In regard to excrement disposal, this is principally effected by pail closets, the contents of which are thrown into the sewers through the manholes at various points. The pail closets are very unsatisfactory, and are a cause of much nuisance, being nearly always found in a filthy condition. This is the kind of testimony we nearly always meet with in regard to the results of employing the pail system in towns. The Report notices also, among other points in the town, the frequency with which windows are found that will not open, and adds, "there can be no doubt that from this cause the air in many houses must be very foul."

Incrustation upon St. Paul's.

THE grey incrustation which has formed upon the exterior masonry of the stone gallery of St. Paul's Cathedral has been found on recent examination to be as much as $\frac{3}{4}$ in. thick in places. Recent analysis of the formation shows its constitution to be as follows: Water, 24·54; carbon, 1·10; calcium sulphate, 59·38; calcium phosphate, 2·22; calcium silicate, 1·63; magnesium silicate, 0.67; iron silicate, 2·40; sand and uncombined silica, 8·06. It appears that the substance is of stalagmitic character, being composed chiefly of calcium sulphate hydrated together with siliceous matter. No one will be surprised at the presence of carbon, as this element is tolerably familiar as a constituent in the atmosphere of the metropolis. The deposit of calcium sulphate is probably due to the absorption by rain of sulphurous and sulphuric fumes from the surrounding chimneys.

Taunton Castle.

TAUNTON CASTLE, of which the great hall, the scene of the "Bloody Assize" of June, 1685, has just been re-instated and repaired, was originally erected for a royal residence in 702 by Ina, King of the West Saxons in 688-728, and burned by his queen Ethelburga after her victory over Eadbricht, King of the South Saxons, who had seized it. Ina's successor, Ethelheard, bestowed the castle and manors of Taunton and Taunton Deane upon St. Swithin's, Winchester. Along the east and south sides of the inner court are remains of the earthworks, with two ramparts, constructed by Ina, against which was erected a wall at the rebuilding of the fortress by Bishop Walkelyn, who also began the rebuilding of his own cathedral, *temp.* William I. The north wall, still marked by its strip buttresses, adjoins the east side of the keep which stands in the western division of the inner court, and measures 50 ft. by 40 ft., the walls being 13 ft. thick; it has a square staircase turret at the north-east angle, and a vaulted basement. At the south-west angle of the west front of the keep is a great circular tower with splayed base, which has been refaced. In the middle of the main south front, 140 ft. in length, is a gate, Early Decorated with Perpendicular additions. In the ruined east gatehouse is the room for working the portcullis and drawbridge, and close by is the chapel. Several Bishops of Winchester, including Giffard, and his successor in the see, Henry of Blois (1129-71) occupied the Castle. At the close of the thirteenth century and beginning of the fourteenth century they built the south front and the round tower. Bishop Langton added the embattled gateway (1493-1501) facing the Castle green, which bears an escutcheon of a cross charged with five roses, and the date "1495," and another of Henry VII.'s coat-arms supported by a dragon and a greyhound. The great hall, measuring 119 ft. by 30 ft., and used uutil lately for the assize-courts, was built by Bishop Horne in 1577, and repaired and altered in 1785-6 by Sir Benjamin Hammet, M.P., who filled in the moat. Robert Blake having recaptured Taunton from the Marquis of Hertford sustained a memorable siege by Lord Goring until relieved by Fairfax. The castle, dismantled after the Restoration, embraces about 7 acres, and stands upon a gravelly eminence on the right bank of the Tone which flows by its north side. Since 1875 it has formed the headquarters of the Somersetshire Archæological and Natural History Society, who acquired it at an outlay of about 4,330*l*. The Society's museum contains six volumes of sketches in Indian ink by J. & J. G. Buckler, father and son, of architectural remains in the county as they existed in the earlier years of the last century, together with the late J. H. Smyth Pigott's large collection of drawings of Somersetshire churches and domestic architecture. In the *Builder* of August 20, 1892, are two illustrations, by Mr. Roland W. Paul, of the castle courtyard and Thomas Langton's gateway.

The Royal Theatre, Wiesbaden.

THOSE of our readers who may chance to be in Germany within the next few months should not omit to visit Wiesbaden to see the new foyer of the Royal Theatre which was opened by the Kaiser on May 10. It has been carried out from the designs of the City Architect of Wiesbaden, and is, in its own way, one of the most remarkable pieces of architecture connected with theatres that are now to be seen in Europe. In form it is almost a complete rotunda, the entrance being underneath the gallery, from which stairs descend on to the main floor. This gallery is connected with a passage which goes round the entire building, and which is broken by balconies at intervals. The decoration is extremely ornate — in detail too much so — but the general effect is satisfactory. It might be questioned whether it is not to some extent a waste of money to build so magnificent an apartment, since, after all, it can only be used for a few minutes between the acts and at the end of the performance, when an adjacent apartment, known as the blue saloon, is used as a restaurant; at the same time it is agreeable to see a building which is not essentially utilitarian erected without any stinting of money and even with magnificence.

Pictures of Egypt.

AT the Fine Art Society's gallery is a collection of water-colour drawings of scenes in Egypt, by Mr. R. Talbot Kelly, which is of more than ordinary interest. The general views show a great deal of power in conveying the character of Egyptian scenery and the impression of strong sunlight. Among those which are most striking in this sense are "Tel-el-Amarna, on the Upper Nile" (4), with its procession of sailing boats on the calm water; "The Pyramids, from the North" (18), standing as it were amid waves of hot barren sand, over one of which a camel is just appearing; "In the Oasis of Fayoum" (14), a large drawing in which the effect of sunlight is very strongly conveyed, and the composition most effective; and "Pyramids of Gizeh from the Desert" (27), one of the pyramids flecked with the blue shadow of a cloud, as one sees it on the side of a hill, only that in our latitude the shadow is black instead of blue. It is noticeable also that Mr. Kelly knows how to put in the figures in his landscape so as to be just in the right place, and to aid the composition; everywhere the figures are well treated and add to the interest of the scene. Mr. Kelly also depicts architecture very well, as in "The Colossi of Thebes" (34) which may count as architecture in a sense; "Mit Gamr on the Lower Nile" (20); "A Mosque Door, Cairo" (6), and another (32) under the same title, which is still better. One of the most effective of all is "Mastaba Below the Second Pyramid" (26), an erection of colossal stones making a line of blue shadow on the hot sand. Among those in which figures form the prominent subject are "A Pastoral near Damietta" (31) and "Going for Water" (6); the latter a very pretty bit of native Egyptian life. We do not quite understand, however, the architectural picture of "Colonnade in the Temple of Luxor"; those columns are certainly much more slender in proportion than the normal Egyptian column, and we feel inclined to put a query to that rendering. But as a whole this is a collection of drawings showing great artistic talent and close observation.

The Architectural Association Soirée.

THE last Association Soirée, held on June 3 and 4 at St. George's Hall, Langham-place, proved to be fully equal to, if not better than, its predecessors, and the musical play entitled "Arctia, a Legend of the Far North," written by Gervase Bailey, the music being by Leonard Butler, had a most hearty reception from the large and enthusiastic audience of architects and their friends. Mr. G. B. Carvill was stage manager, and is certainly to be congratulated on the whole production of the piece. The vote of thanks to him and the authors, and all who assisted, proposed by Mr. H. T. Hare, the new President, was most warmly responded to, and repeated calls were made for Mr. Carvill and the authors. The former, in a neat little speech, returned thanks for the company and himself, and assured the audience that the players had enjoyed themselves quite as much as had apparently the spectators. The social side of the Architectural Association is, perhaps, shown at its best on these occasions, and no better argument is needed to prove the vitality of the Association and the good work it does in encouraging that *esprit de corps* among its members so essential for the furtherance of its educational aims.

LEEDS VICTORIA MEMORIAL.—Mr. George Frampton, R.A., has been commissioned to execute the monument which is to constitute the Leeds memorial to Queen Victoria, and which is to include a statue of her late Majesty.

LETTER FROM PARIS.

THE pedestal for the monument being raised in the courtyard of the Opéra to the memory of the late Charles Garnier is nearly terminated. This pedestal, formed of pink Scotch granite, is the design of M. Pascal, architect, the sculptor being M. Denys Puech. The inauguration of the monument will take place next October.

The vote for the medals of honour at the Salon has just taken place. That for the section of Architecture was made under the presidency of M. Daumet, and the medal was awarded to M. Henri Eustache, pupil of M. Ginain, for his large and fine drawings (already referred to in the *Builder*) showing the actual state of the Via Sacra at Rome, and a restoration showing its aspect during the fourth century before Christ. Drawings of a number of Byzantine buildings at Mistra, in Greece, completed the exhibit. First medals were awarded to M. Albert Bruel, pupil of MM. Blondel and Scellier de Gisors, for his drawings of the south-west side of Mount Palatine, at Rome, and to MM. Paul Guadet and Prudent, both pupils of M. Guadet, for their restorations of the Salle Louis built in 1790 in the Palais Royal, and the Theatre Français. Medals of the second class were awarded to MM. Malgras-Delmas; for his Palais de Fervaques, at Saint Quentin; Louis Guinot, for drawings of the exterior and interior of a house at 22, Rue Hamelin, Paris; Emile Brunet, for some careful measured drawings of the choir of Saint Etienne d'Auxerre; and Georges Gromort, for various water-colour sketches of Italian architecture.

M. Eustache, the winner of the medal of honour, has presented his set of drawings to the Académie.

In the section of painting the medal of honour was awarded to M. Joseph Bail, for his picture of an interior scene entitled "Les Dentellières." In sculpture, the medal of honour is carried off by M. Hippolyte Lefebvre, for his group entitled "Jeunes Aveugles." No medal was awarded in the section of engraving, no candidate obtaining a majority of the votes.

Mlle. Marie Pellechet, sister of a late well-known architect of that name, has offered a sum of 12,000*l.* to the Académie in memory of her brother, the interest of which is to be employed for the purpose of preserving any monuments in France or her Colonies presenting an archæological interest. The Académie has accepted this offer.

The Société des Amis des Monuments Parisiens will hold its next meeting this week, and will discuss the various proposals and schemes concerning the embellishment of the ground to be left vacant by the demolishing of the fortifications of Paris; the recent archæological discoveries at the Church of St. Pierre, at Montmartre; and some proposals made by M. Charles Normand to undertake excavations under the Lycée St. Louis for the purpose of bringing to light a second Roman theatre at Paris, and in the Rue des Ecoles in the grounds of the Collége de France, where a Roman monument is known to exist.

The post of Professor of Architecture at the Ecole des Beaux-Arts, left vacant by the death of M. Coquart, was keenly competed for by a number of well-known architects. The majority of votes, however, designated M. E. Bénard, Architecte du Gouvernement and Prix de Rome, and this choice has now been confirmed by the Minister of Public Instruction and Fine Arts.

The work of constructing the third line of the Metropolitan Railway at Paris, from Courcelles to Menilmontant, has just been adjudicated in six contracts amounting to a total sum of 630,000*l.*

M. Fouquian, architect, is preparing the plans of a new theatre to be constructed at Paris on a site comprised between the Restaurant Julien in the Boulevard des Italiens and the Rue Louis le Grand.

On May 16 last a banquet was given at the Palais d'Orsay by the Union Céramique de France to the members of the British Institute of Clayworkers, of whom about forty members were present, presided over by Mr. Collier, President of the Institute.

The thirtieth congress of the Société des Architectes Français opened on the 2nd inst. in the theatre of the Ecole des Beaux Arts. The report of it we defer to next week, in order to treat the proceedings as a whole.

The first stone of the new buildings destined to enlarge the Palais de la Bourse at Paris was officially laid on May 14. A plate of copper on which was engraved by M. Calvel an enlargement of the plan of the original Palais de la Bourse by Brogniart, was placed in a recess in this stone, and a print drawn from this plate was distributed to each of the members of the Compagnie des Agents de Change.

The Committee of the Salon of Furniture Industries, which will be held in the Grand Palais in July next, has decided to add to the interest of its exhibition by offering awards for the best specimens of artistic advertisement posters connected with such industries. The jury will be composed of artists, amongst whom are MM. Edouard Détaille, Jules Chéret, Dubufe, Léandre, Maignan, Luc Olivier Merson, Steinlen, &c.

The inauguration of the Museum of Decorative Arts in a portion of the Pavilion de Marsan at the Louvre is at present indefinitely adjourned by reason of the unfinished state of the installation, and owing also to a difference which has arisen between M. Redon, the architect to the Louvre, and the committee of the Société des Arts Décoratifs. It is the desire of the latter to maintain in its entirety the large hall situated on the right of the entrance on the Rue de Rivoli, but M. Redon greatly desires to occupy a portion of this hall by a monumental staircase, a feature which appears in the original design by Lefuel, who reconstructed the Palace after its destruction during the Commune. The Pavilion de Marsan was destined as a "Cour des Comptes," and the monumental staircase designed by Lefuel was to occupy the greater portion of this entrance hall. The committee is of opinion that this staircase will take up too much of the useful space, and besides, it does not care to authorise the expenditure of 4,000*l.* which this staircase would cost. A sum of 48,000*l.* has been put aside by the Société for the interior work of arrangement and installation, and 16,000*l.* have already been spent on that portion which it is hoped will shortly be opened to the public.

The Académie des Inscriptions et Belles-Lettres has awarded the Prix Fould, of a value of 200*l.* destined to recompense the best works on the history of the arts up to the end of the seventeenth century, in equal portions to M. George Durand, for his monography of the church of Notre Dame, Cathedral of Amiens, and MM. Koechlin and Marguet de Vasselot for their work on the sculpture at Troyes and in Southern Champagne during the sixteenth century.

M. Bouvard has requested M. Formigé, architect for the promenades of Paris, to study the question of installing the celebrated fountain of Sèvres ware in the grounds of the Galliera Museum, where it will be sufficiently protected at night time. It will be remembered that this fine piece of work was ruthlessly damaged during the Exhibition, and M. Sandier, manager of the Sevres manufactory, has prepared replicas of the damaged portion for re-erecting.

Great complaint is being made concerning the state of the avenues on both sides of the Seine occupied during the Exhibition by the various international buildings and shows, which have now been demolished, while the ground has been left since in an incomplete state of ugliness. M. Bouvard, however, finds it impossible to complete this work until some decision has been come to regarding the transformation of the Champ de Mars, and the sale of the ground bordering on this space, which will give him the credit of about 40,000*l.* necessary to put into hand the complete scheme of arranging the Esplanade des Invalides into a rich garden in the style of those at Versailles, the continuation of these gardens along the quays as far as the Pont des Invalides and the Pont de l'Alma, and the restoration of the fine winter gardens remaining over from the Exposition on the Cours la Reine.

The chief portions of the buildings of the Museum of Natural History at Paris are rapidly falling into ruin, and require immediate restoration and the construction of new buildings. A credit of 480,000*l.* is estimated as necessary for this work; it is intended to complete the fine galleries of comparative anatomy and to build a new pavilion for botany. The zoological galleries on the Rue Geoffroy St. Hilaire will also be enlarged and the old galleries demolished. The galleries occupied by wild animals will also require complete reconstruction. Parliament has been asked for the necessary credit, and M. Blavette, the architect entrusted with the work, is about to visit and study the most important of the zoological establishments in Europe.

One of the artistic events of last week was the sale of the collection of modern pictures made by M. Georges Lutz, an amateur of great judgment. Many of his pictures went for high prices. Corot's "Lac de Garde" sold for 231,000 fr., his "Matin" for 95,000, and Rousseau's "Bord de l'Oise" for 54,900. Boilly's "La Distribution des Vivres aux Champs Elysées" was bought by the Paris Service des Beaux-Arts for 30,000 fr., to be placed in the future museum at the Petit Palais. The total results of the two days' sale, at the Georges Petit Gallery, amounted to 1,811,649 fr.

At the Institut the Prix Frémont and the Prix Deschaumes have been awarded. The former, founded for painters and sculptors, has been divided between a young painter, M. Guétin, and a sculptor, M. Larrivée. The special object of the Prix Deschaumes was to distinguish young architects who had combined artistic talent with domestic virtues and devotion to their parents (whether the young French architect is supposed to stand particularly in need of encouragement in these "vertus familiales" we do not gather); the prize was awarded to M. Wielowski, a pupil of M. Laloux.

The French journals have rather too prematurely announced that the monument to Jules Simon, by M. Puech, was to replace, on the Place de la Madeleine, one of the two fountains to right and left of the Rue Royale. The operations for making the change were indeed commenced, but the inhabitants of the quarter protested strongly against the removal of one of Davioud's fountains, and were supported by the "Vieux Paris" Committee, which has made a point of protesting against unnecessary alterations of any of the existing monumental decorations of Paris; and in deference to this double representation the administration have for the present, at all events, suspended the work. The question will however come up again before the Municipal Council, which may insist on proceeding, as it is only too apt to place political considerations before those of art.

The Government has decided to accept the museum left to it by Gustave Moreau, being partly moved to this decision by the liberality of M. Henri Rupp, an old friend of Moreau and his "legataire universel," who has endowed the museum with the sum of 470,000 fr. to furnish the revenue necessary for its maintenance.

The centenary of the Hospital Schools has just been celebrated, and this event, though purely scientific in its general bearings, has been the occasion also of an artistic manifestation, M. Puech having been commissioned to celebrate the occasion by the production of a bas-relief representing a clinical consultation in the surgical ward, while the Government have engaged M. Bottée to design a commemorative medal. This represents, on the principal face, a young medical student working under the direction of a figure representing "Médecine"; and on the reverse is a figure representing the City of Paris, bending over a young doctor who supports the head of the invalid. On the background is seen Notre Dame, and more distant, the portico of the old Ecole de Médecine.

The monument to Daudet, by M. Saint-Marceaux, was inaugurated last Saturday, in the part of the Champs Elysées bordering on the Avenue Gabriel. The precedent is regarded by many Parisians as rather a doubtful one, which, if followed up in other cases, will tend to make of the Avenue des Champs Elysées a kind of necropolis. Apart from that, there can be nothing but praise for the work itself. The sculptor has represented the great novelist with the rather sad and invalid expression which characterised him during the latter years of his life. The figure is seated, with a cloak drawn over the knees.

M. Sauvageot, the architect in charge of the restoration of the church of Saint-Pierre at Montmartre, has discovered on the site some interesting fragments of mediæval tombstones, and also the tombs of two abbesses of Montmartre, dated 1280 and 1317, sculptured with their effigies.

M. Mercié, who produced the fine group which decorates the monument to Louis Philippe in the Chapelle de Dreux, has received from the Duc de Chartres a commission for a monument, in the same chapel, to his son,

Prince Henri d'Orléans, who died recently during a tour in the far East. The sculptor has completed the model for this monument, which represents the young explorer as if on his death bed, and casting a last look on the plans and maps before him. The completed work will probably be seen in next year's salon.

The unaccountable disappearance of M. Captier, the sculptor, has been a disturbing event in the artistic world. It is suspected that he has committed suicide. After having made his will and written several farewell letters, the unfortunate artist disappeared from his home and has left no trace of his whereabouts. Captier was a pupil of Dumont and of Bonnassieux, and had received medals in the Salons of 1869, 1872, and 1889, and at the exhibition of 1900. He is the author of several good works, and this year he had exhibited at the Salon a "Venus Anadyomene" in marble. He was well off and enjoyed a good reputation in every way, and his mysterious conduct is attributed to mental aberration.

THE WESTMINSTER DORMITORY.*

By ARTHUR STRATTON, A.R.I.B.A.

THIS building as it stands to-day, in the quiet secluded spot almost within the shadow of the Abbey of St. Peter, has not, as one might expect, escaped molestation; indeed, at every period, from its original inception almost to the present day, it has been exceptionally maltreated. Whilst the outcome of this is, naturally enough, an impoverished architectural work, yet it has been the means of investing the building itself with no slight historical and antiquarian value, quite apart from that which it inevitably enjoys through its association with so many distinguished scholars and statesmen who have lived and worked within its walls during their sojourn in the celebrated Westminster School.

To trace its history from the internal evidence of the architectural character of the work itself, and from records hidden away in the keeping of various authorities, has been an undertaking of considerable difficulty and magnitude, although full of interest and value.

In the first place we are struck with the succession of disputes and contentions which attended the building of the structure under consideration. Such hindrances are only too common nowadays; but even in the early part of the eighteenth century we find that architects of renown were not spared the mortification of seeing their schemes altered and spoilt, or even thrown over altogether for lack of funds to carry them out. As we shall see, this dormitory, when eventually completed in or about 1733, was little more than a very thinned down version of the original schemes prepared for it; and yet again in our own time, it has been so "restored" and "improved" that almost all that vested it with the true spirit of design has been done out of it.

To show what these original designs were, and to compare them with the building as it now stands, is an object-lesson of first-rate interest to the student of architecture and to the antiquarian alike, and forms a fitting subject for this bursary, which is intended to promote the study of such eighteenth century examples, and to preserve and to put in order any records bearing upon their past and present conditions.

A dormitory has always been required for the use of the scholars of Westminster School, and a mediæval structure once stood upon or near to the site of the present building. Of this nothing remains. Nor have we been able to find any trace of it or reference to it, except in certain entries of the Chapter House records.

From these records we learn that in 1708 Sir Edward Hannes left 1,000*l.* to be employed in the erection of a building for the use of the King's forty scholars, as directed by the Dean and Chapter, "in contriving whereof Sir Christopher Wren should be consulted." It was not till 1711 that any definite steps were taken, and then Sir Christopher Wren drew up a report to the effect that this sum of money had better be spent upon repairing the old building then in use, as he did not consider it to be enough to build and equip a new one. He did not, therefore, at this stage make any original design, and the matter lapsed for a while.

* This Report, with the accompanying drawings, forms the first monograph executed under the conditions of the Banister Fletcher Bursary which is awarded in connexion with the Architectural Association, London.

An interval of two years then followed, during which nothing apparently was done.

The scheme must, nevertheless, have been occupying attention, for on April 23, 1713, it was ordered* "That Mr. Dickenson, by the direction of Sir Christopher Wren, draw up a full and exact account of what work is necessary to be done at the College chambers, and to fix the estimates of such particular articles as shall be laid before the Dean and Chapter, that the price of the work may be fixed, and proper workmen, approved by Sir Christopher Wren, enter into such contracts as shall render this charge certain."

The saving clause, "provided it can be done by Sir E. Hannes' legacy and other contributions without burdening the College with the expense of it" seems again to have brought matters to a standstill, for we hear nothing more of the project for five years, although without doubt all the time strenuous efforts were being made towards the erection of an entirely new dormitory.

At last, in 1718, a definite move was made and an entry in the Records at that time tersely refers to the tardy progress made in the preceding five years in the following words:—"On the 7th of January, 1713, the Dean and Chapter, upon a prospect of contributions, as is now said, made an order for the building of a new Dormitory in the College Orchard or Garden, which order notwithstanding this prospect, slept in the Chapter-book five years till it was quite forgotten."

The authorities, however, in 1718, seem to have quite determined that a new Dormitory was necessary, and that funds should be raised to erect it; so on December 8, 1718, the Crown was petitioned for aid in defraying the expense.

The entry recording this is quickly followed by another dated December 29, 1718, to the effect that donations of 1,000*l.* from the King and 500*l.* from the Prince of Wales had been received.

In the meantime, Sir Christopher Wren had been preparing designs, some of which, dated January 17, 1718-19, are preserved in the All Souls' Collection, Oxford.

It was finally settled in June, 1719, that the new Dormitory should be begun, and immediately after the order to proceed was obtained, the scholars were removed from the old Dormitory and taken to Chiswick.

At this juncture all difficulties had been apparently overcome; nevertheless the most serious opposition was made to the execution of the scheme from a very unexpected quarter.

The head master at that time, one Dr. Friend, as the outcome of a dispute as to the site of the new building, brought an action against the Dean and Chapter, seeking for an injunction to restrain the building, on the plea that it would encroach upon his ground and block out his views to a very serious extent. As far as can be ascertained this same Dr. Friend had approved of the site in the years immediately preceding this strange course of action. He brought such weight to bear, however, that a lawsuit necessarily followed, and this, again, not merely occasioned long delay but swallowed up funds, and, worst of all, led to wholesale alterations in the plan and design of the building, much to its detriment and our irreparable loss.

After years of dispute, finally the Dean and Chapter decided to build on the site chosen long since, with due regard to Dr. Friend's stipulations.

The actual work seems to have been in progress during the year 1723. From this period building operations must have been conducted by other hands than those originally intended, and that at the most critical juncture as regards the architectural merits and demerits.

Too much stress can hardly be laid upon this fact, for henceforth Wren's dormitory was no longer Wren's; the design was no longer his; with the execution of it he had nothing whatever to do. In spite of this the building as it stands is frequently spoken of as a work of Wren's and judged accordingly.

One of the principal objects of this monograph is to ascribe the various parts of the work, as far as now possible, to the right authors. It is evident that Sir Christopher Wren's design (fig. 1) made in 1718-1719 was never carried out. He died in 1723, the year in which apparently building operations commenced.

* For access to the Chapter House Records I am indebted to the courtesy of Dr. Rutherford, the then Headmaster.

This design presents a most dignified façade seventeen bays in length, the three central ones being set forward slightly between rusticated pilasters corresponding with those at the two extremities; the arcade to the ground story is open and continuous, whilst the centre of the whole façade and of each wing is accentuated by connecting the main windows with the circular wreathed openings above, which take the place of the square attic windows forming part of the composition of the other bays.

This design must have passed into other hands, for in the King's Collection of Maps and Drawings in the British Museum there is a drawing of a design inscribed, "In Usum Alumnorum Scholæ Regiæ Westmonasteriensis," obviously based upon it, but still with such alterations as suffice to take away the broad reticent character which Wren so infused into his. It shows (fig. 2) the same disposition and number of bays, but the parapet and main cornice are broken forward at intervals, and the former is given a circular curve in the centre of the façade. The circular wreathed openings disappear, and are replaced by rather clumsy windows; indeed, the whole front has suffered and after Wren's design looks course and commonplace. It is exceedingly difficult to say for what purpose or under whose instructions this drawing was made, but it is valuable as a link in the chain of evidence, and prepares one for subsequent developments. It is signed only with the name of J. Kip, sculp.

The Earl of Burlington (1695-1753) next appears in connexion with the work. On January 1, 1723, the following important entry is recorded: "Resolved that Dr. Brodrick do wait on the Right Honourable the Earl of Burlington, and in the name of the Dean and Chapter return their humble thanks to his Lordship for the care and trouble he has already taken in building the College Dormitory, and desire his Lordship that he would be pleased to proceed with the same according to his Lordship's plan.

Henceforth Burlington is openly accredited with the design, and in Kent's volume of designs by Inigo Jones it is boldly assigned to him. The plate (vol. ii., plate 51) is inscribed as follows: "Plan de l'arcade et façade du dortoir à Westminster désigné par le Comte de Burlington: l'arcade est de 18 pieds de haut, et au dessus il y a une grande chambre pour les garçons élevés par le roi, qui est de 26 pieds de haut; le dedans de laquelle est maintenant finis tout à fait différent du premier dessein, avec un escalier irrégulier au bout, par une autre main." The drawing is signed "Burlington, architectus," and "H. Flitcroft, del."

Whether Burlington acted as architect in the manner claimed above, or, as is more probable, simply in the capacity of "chairman of a building committee," as Mr. R. Blomfield* suggests, it is certain that he or his committee tampered with the design sufficiently to eliminate the principal points of interest and to leave it decidedly tame and monotonous, though not by any means lacking in force and dignity. He omitted two entire bays, thus reducing the façade to fifteen bays in length, and omitted also the central break which so helped the composition; and the building at the end, shown on both the original designs (figs. 1 and 2) to contain the staircases, also disappeared. There is no doubt but that the lawsuit and the resulting restrictions and impoverished funds were largely accountable at this stage for the mutilation of Wren's design.

The building, as carried out, is shown in the print in Kent's work above referred to. In the absence of evidence to show that the niches were ever occupied by statues, as obviously was the intention, and as they are shown in this print, we are inclined to think that they were never placed there.

In the measured drawings accompanying this Report (see lithographs) the building is shown accurately to scale as it must have left the builder's hands, but not quite as it stands to-day, on account of subsequent alterations.

On January 17, 1846, it is recorded "that the Dean and Chapter having ascertained that the present dormitory was built more than a century ago by subscriptions of persons educated at Westminster, in addition to large grants from the Crown and Parliament, have thought it reasonable to appeal again to the Crown and to old Westminsters of the present time for

* "Renaissance Architecture in England," vol. ii., p. 226.

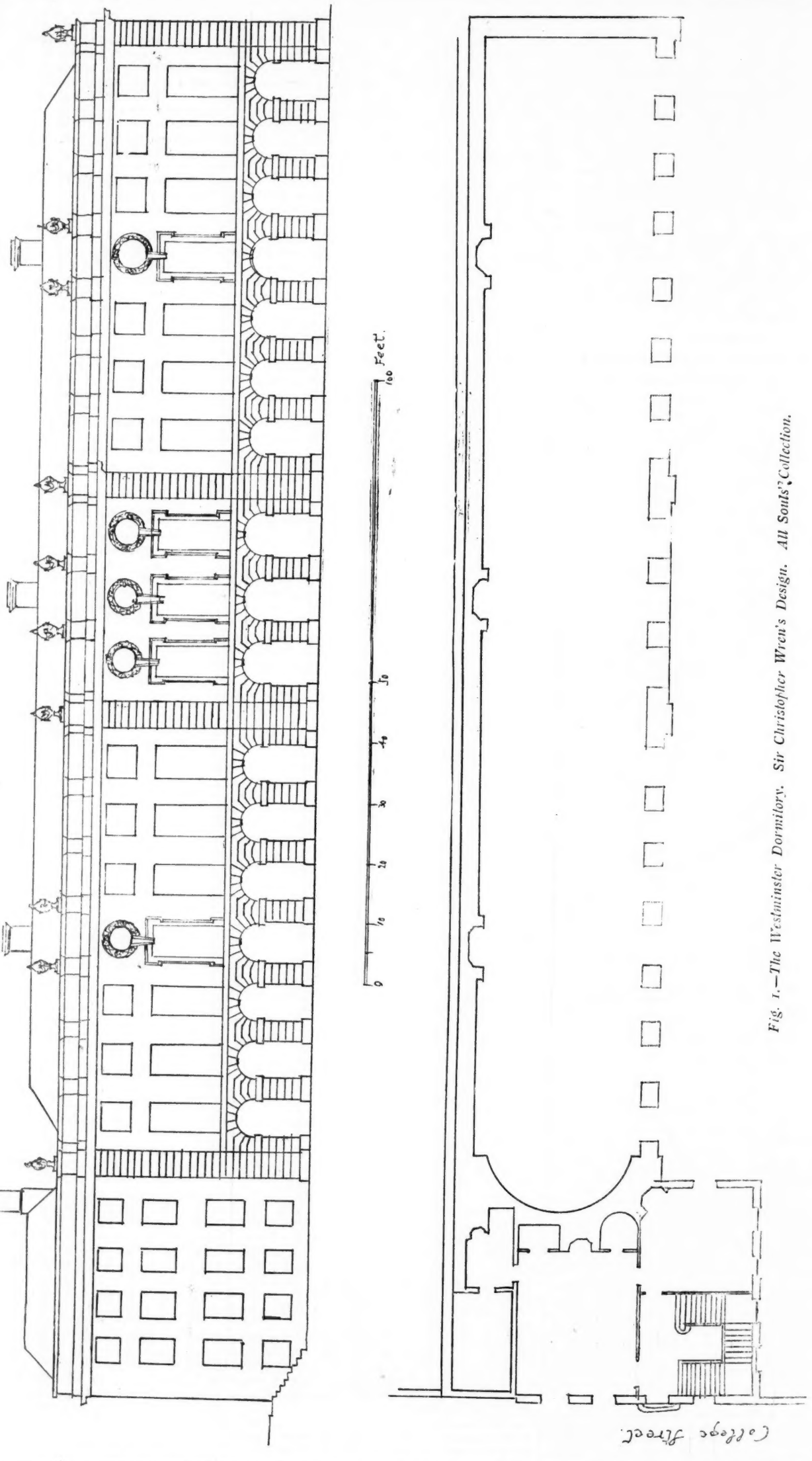


Fig. 1.—The Westminster Dormitory. Sir Christopher Wren's Design. All Souls' Collection.

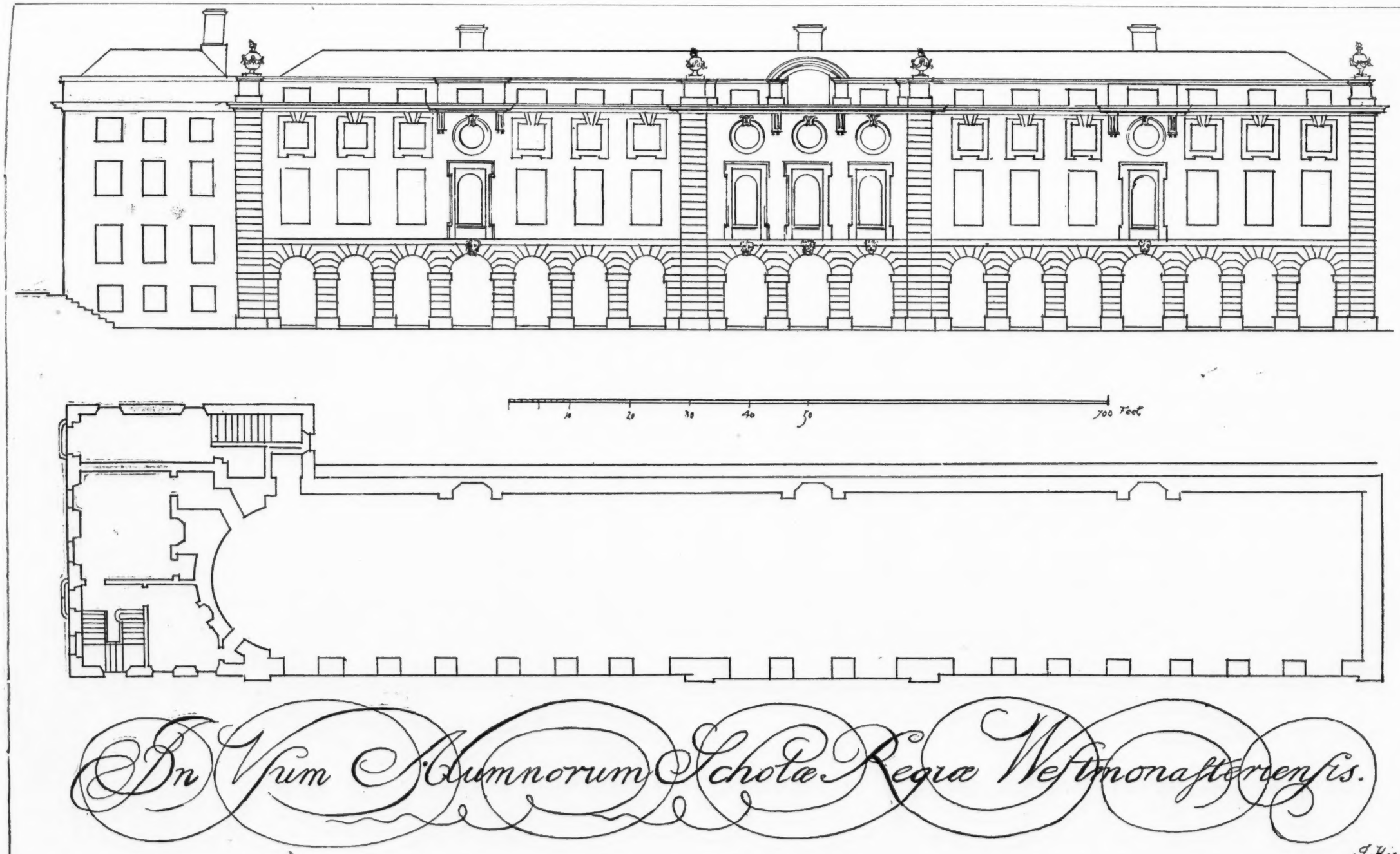
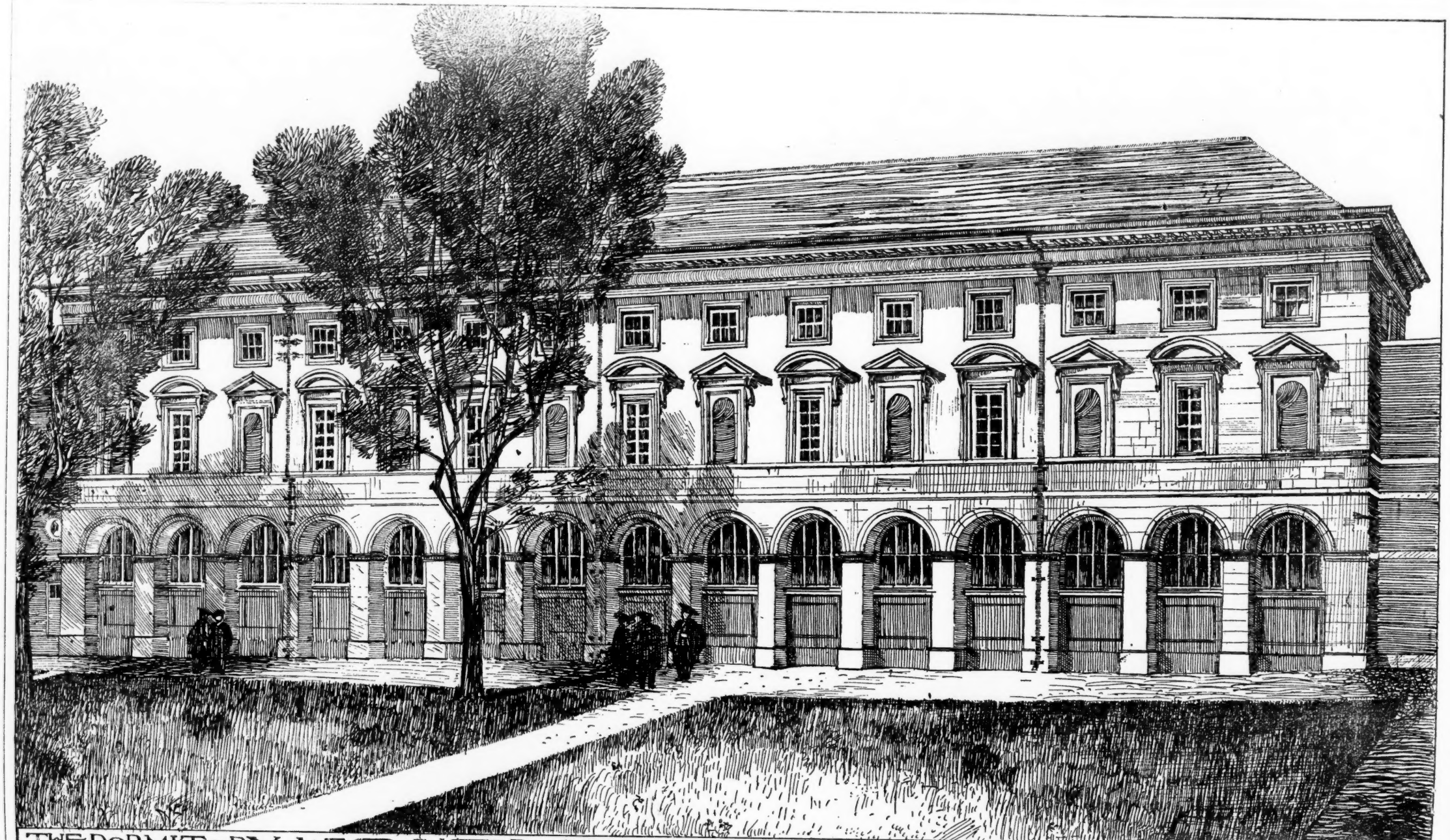


Fig. 2.—The Westminster Dormitory: From a Drawing in the British Museum.



THE DORMITORY WESTMINSTER. SKETCH SHOWING ITS PRESENT STATE. SINCE MODERN ALTERATIONS.

Fig. 3.

Arthur Stratton, delt. 1901.

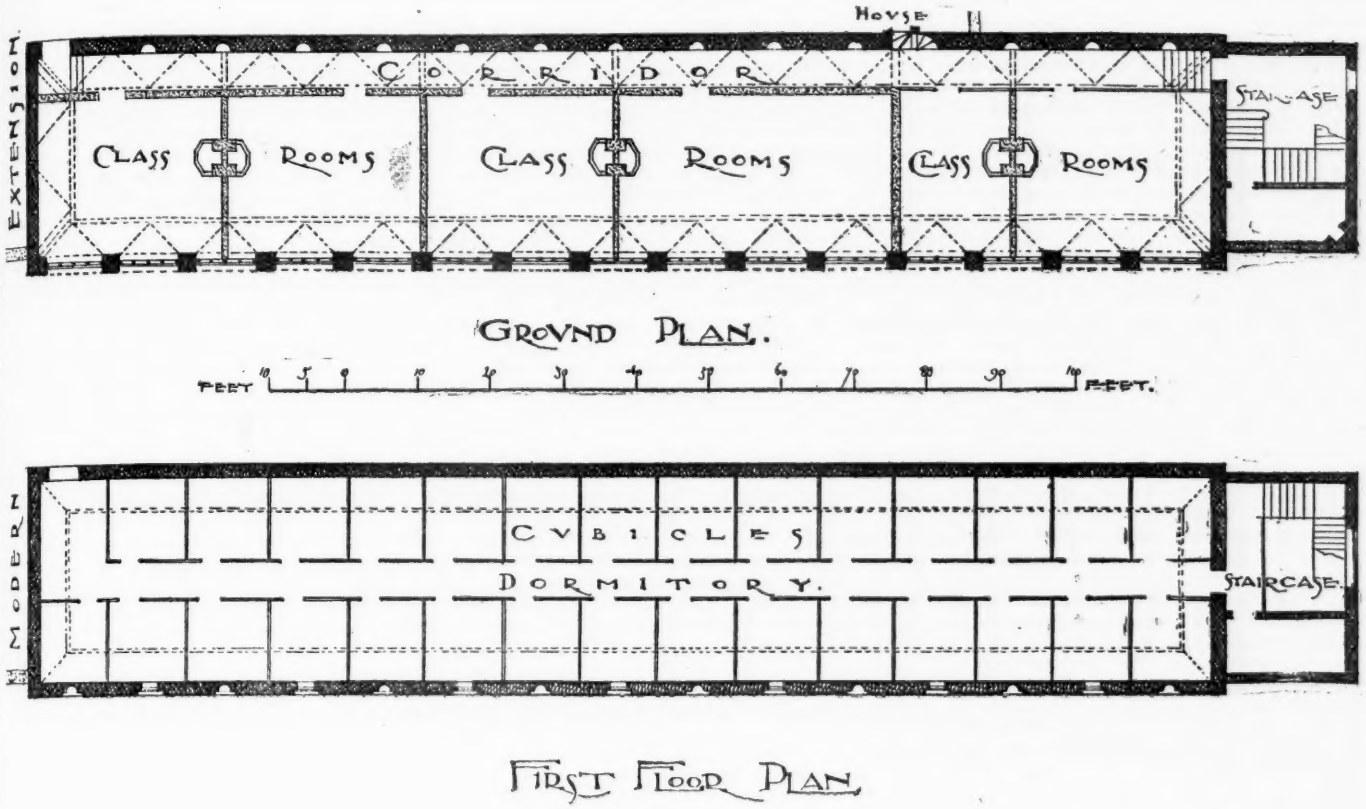


Fig. 4.

their aid to render more accordant with modern manners the building which has hitherto with much inconvenience been applied to the manifold purposes of a study and dormitory." As a result of this appeal the lower arcade of fifteen bays, which had always been open, and was always intended to remain so, was filled in with masonry and glazing as is shown in the two end bays of the measured drawings and in the perspective sketch in this Report (fig. 3). The large apartment thus obtained was at the same time divided up by cross and longitudinal walls, as shown in the plan (fig. 4), forming in all eight classrooms. These cross walls cut into the centre of some of the bays, and cut the groined cove without any regard for the continuity of the design. This modification is much to be deplored. The cove to the ceiling, all of white plaster, is one of the most striking features of the whole building, and the succession of intersecting surfaces, with the play of light and shade upon them, must have been very striking when seen uninterruptedly. The detail of it is quite simple and skilfully designed. It consists of a quadrant cove intersected by circular vaults of the same diameter, the resulting intersection being a true curve, out of winding, making angles of 45 deg. on plan, as shown on the measured drawings. The longitudinal wall forming the corridor which was set up at the same time as the cross walls (see fig. 4) is placed beneath the soffit A; this forms a true cornice on the classroom side, and accordingly has scarcely the appearance of a makeshift.

Between the years 1847-50 the existing matron's house was built as an annex to the south of the dormitory. This is an important point, for it corroborates other evidence to the effect that the building shown on both the original designs (figs. 1 and 2) and containing the staircase, was never erected.

In the King's collection of maps and drawings in the British Museum, before referred to, there is a sketch distinctly showing the dormitory and other buildings in the immediate vicinity, with the Abbey in the background. This shows the building quite correctly from an antiquarian point of view, but the actual draughtsmanship is bad. It is signed by W. Courtenay and is dated 1758. From this it is quite certain that no building was then standing where the present matron's house stands, and where the staircase block was meant by Wren to be erected. The staircase to the dormitory on the first floor seems always to have been contained in the low adjunct to the north built of brick, with stone quoins (see measured drawings). Of the original stairs not a vestige remains, and it is difficult to conjecture what form they took.

On June 12, 1733, it was ordered "that the staircase in the new dormitory, the chimneypieces, and slabs there wanted, and the paving of the cloyster under it be also carried on and finished by direction of the Committee." In all probability a wooden staircase led up to the doorway A (see plans) in much the same manner as the existing stone one. But this latter only dates from the 1846 alterations, and is not in any sense worthy of the building; it is partly carried on iron joists; the iron balustrade and the handrail is of the poorest description. It will be remembered that the staircase is not claimed for Burlington in Kent's "Inigo Jones" (see *ante*).

It yet remained for one of the most disastrous "improvements" to be made in 1895. The long, lofty apartment on the first floor, which had always been used as a sleeping apartment for the scholars, was considered to be ill-lighted and ventilated with only a single range of windows high up. It was accordingly decided, on the advice of Mr. T. G. Jackson, R.A., to cut through the alternate niches and to insert casement windows. This, together with the filling in of the arcade below, which was always intended to be open, has done much to detract from the architectural merit of the building. The new windows look particularly unfortunate, owing to the double reveal occasioned by the conversion of the niches. At the same time the roof was slated and new gutters were added, but the main timbers of the roof trusses, rafters, ceilings, joists, &c., are still the original, and are of English oak.

The façade is entirely of stone, but instead of Portland stone which Wren intended, Bath, or some similar stone, was employed, which is not so well suited to the London atmosphere; it has not weathered with the silvery hues which give such a charm to Wren's Portland stone buildings, but has simply taken a dirty black tone, whilst the surface has in places succumbed to the inroads of the chemicals which are so destructive in London, and frequent patchings with new stones are noticeable. The enrichments and cornices, jamb and arch members, are everywhere vigorously carved and add considerably to the interest of the work.

In spite of such a chequered career, this building has not lost all its fascination; possibly Mr. Loftie was not over enthusiastic when he wrote in 1893, "There is certainly nothing in English architecture more quietly beautiful than the elevation of the Westminster Dormitory." A façade some 166 ft. in length, and 50 ft. in height, consisting of a repetition of a simple well-designed bay, cannot fail to be dignified and reposeful.

Without doubt the filling-in of the arcade struck at the root of the whole design and destroyed its *motif*, whilst the sacrifice of the niches to modern requirements in the form of windows, again destroyed much of the character of the building.

The whole history is interesting and valuable, and cannot fail to impress the architect. It is a splendid example of the limitations and restrictions which dog his footsteps at every turn, and over which he frequently has no control, albeit his work suffers. To strive after the monumental and the large conception should be our constant aim, but it is useless to ignore the fact that houses are built to live in, and not merely to be looked at.

SILCHESTER.

THE annual exhibition of objects of interest found during the past year in connexion with the excavations on the site of the Roman town of Silchester, not far from Reading, is being held in the meeting room of the Society of Antiquaries at Burlington House, and will remain open until and including Tuesday next. Two *insulæ* have been explored (Nos. xxii and xxvii on the plan exhibited) in the northern half of the town, the area being partly enclosed by the outer wall. In the latter of the two *insulæ* remains of three houses were found, two of considerable size, and bearing interesting evidence of extension subsequent to their first erection. Several tessellated pavements were unearthed, two of which were found in sufficiently good condition for preserva-

tion and removal. A large portion of one of these is exhibited, and others are illustrated by carefully coloured drawings to scale by Mr. Geo. E. Fox, F.S.A. On the site of one of these houses interesting traces were discovered of the half-timbered upper story. The clay of which the filling-in was composed had been hardened by fire, thus retaining the impression of the pattern originally stamped on the face, and also the impression produced by the laths and woodwork at the back and sides. A curious parallel instance is shown from a book illustrating an example from the Continent. Other architectural fragments include a portion of a sculptured stone, supposed to be the head of a niche, the remaining spandrel filled with a representation of a figure, while the soffit has a conventional leaf ornament repeated at intervals. At one end is also a trace of a conventional foliage pattern. Another fragment is said to be that of a finial.

Among the other finds is a quantity of pottery, one with a cock in slight relief, another with a running deer, a third has a number of letters incised, the meaning of which, however, has not been deciphered. Several objects in pewter are shown in remarkably good preservation—a jug, a flanged bowl, and a bucket. In connexion with the last-named is a large iron hook into which a wooden handle or pole has been fixed; perhaps used for lowering the bucket into a well. A collection of various articles of small size has been made, brooches, pins (of iron and wood), coins, fragments of delicate glass vessels (one with a fish, another with lettering), also many iron implements, including two good examples of wheel tyres, interesting pieces of painted plaster from the walls, and additions to the number of seeds of fruits and plants already found in the pits and identified.

During the present season work is being continued, the part chosen being at the eastern end of the town, near the present Parish Church, and the site of two temples already discovered, and illustrated in these columns. The result of this year's work should, therefore, not in any sense be of less interest than the results already obtained in former years. A large portion of the site has now been examined, and with helping funds we shall soon have a highly interesting and fairly complete plan of a Roman city. The pavements and various objects of interest found are all being deposited in the museum at Reading, which should be seen by all interested in the subject, bearing as it does the same relation to Silchester as the museum at Naples does to the ruins of Pompeii.

THE ORIGIN AND SYMBOLISM OF CHURCH ORNAMENTS.

THE Rev. J. Hermitage Armstrong presided on Wednesday, the 28th ult., at the Church House, Dean's-yard, S.W., over the annual general meeting of the Church Crafts League. At the commencement of the proceedings the chairman congratulated the League on the very successful exhibition which they had had during the past month in the Church House, and remarked that although the exhibition had evoked some criticism, yet it was something even to get criticism.

Canon Rhodes Bristow opened a discussion on "The Origin and Symbolism of Church Ornaments," and referred first to the lights which adorned the altar and the sanctuary, which were amongst the chief ornaments of the church. He said that while no doubt the origin of lights in churches was to enable people to see, yet at the same time they were symbolical of joy and gladness and particularly with regard to the two lights on the altar they represented the two-fold nature of the Light of the World. With respect to incense again, it was probable that it was used in the first place for fumigation, but there was also a symbolism attached to its use—it was symbolic of the fervent love which inspired prayer. Then again as to pictures and sculptures and images. Doubtless these were used first to cover blank spaces in the walls, but they had the further use of bringing things clearly before the eye, which sank into the heart. Thus, although the origin of all these things may have been in their primitive usefulness, yet the church had recognised in them opportunities of helpfulness in driving home great truths and art came to be recognised as being of great value in these departments.

Mr. Stirling Lee said the study of symbolic language was one of the most interesting of studies. From the very earliest times they found the highest thoughts expressed in symbols. Going back to the early Egyptians, they found the crocodile deified, and when they inquired why, they found the crocodile could see through the muddy waters of the Nile, and was a tongueless animal, and consequently it was taken as symbolic of the all-seeing eye of God and the voiceless God. In the times of the early Greeks the same symbolic language was found, and on the walls of the temples were expressed the highest of thoughts. The same thing occurred with the Hebrews, who were of a highly poetic nature, and largely used symbols to illustrate the mystic and the unseen God. They found this in the building of the Tabernacle. One instance was the wrought metal altar—which he would like to see used in churches now—which was symbolic of the unity of the tribes of Israel. Then with regard to the Church, they had still to look for the same symbolic meanings. First was the Church in the Upper Room, and then the basilica was built, where very simple forms were used. The church grew, and in the Gothic churches they got back almost to the Tabernacle again, with its three divisions. There was the symbol of the nave, for the ship—*navis*—the ark come back. There was the chancel with the screen. The screen was symbolic of the drawing back of the veil, and where there was no screen there was no symbolic meaning. It was the dividing line for the Holy of Holies, and therefore the screen became one of the greatest things the artist had to do, and it was in the screen they gave expression to their highest thoughts. It was through that screen that entrance was made to the Holy of Holies—the veil was rent that man might approach the altar. So in the early days the screens became the finest objects of art in the cathedrals. Then they found the sacrificial altar developed into the altar, and above the altar was the reredos on which the artists illustrated their thoughts when before the altar-table itself. So they got the three parts of the church, and it was interesting to the architect to know when he started a church what his symbolism was; to know what he meant to illustrate, for he took his construction by his symbolism, and to him it was a living thing. He was going to build every part intelligently with meaning, and as every part of the tabernacle in the wilderness had meaning, so he built the church with absolute symbolic meaning. Coming first into the church was the font, which was a very beautiful thing for the sculptor to illustrate, for here was the source which was going to flow through the Church, the spring going to flow into the great sea. The one ornament of the church which changed every Sunday was the flowers on the altar, and these flowers were full of symbolic meaning to everyone who observed.

Replying to a question, Canon Rhodes Bristow said that apart from its symbolic meaning, he had little doubt but that incense was used as a disinfectant by the Hebrews.

The Chairman observed that he was reading some old service books of the time of Edward VI. and found prayers authorised to be used in the times of certain sickness and the priest was ordered first to use some kind of fumigation.

Mr. Dyer Edwardes thought the use of incense went back to very early times. He had a censer used in the early Coptic Church which he brought from Egypt, and they saw it depicted on the early Egyptian monuments. He would give an example of how a structure could become the symbol of character. He had been to the Escurial at Madrid. They knew that Philip II. as an old man became extremely melancholy and he looked about for some place where he could pass his days in meditation and prayer. The site of the Escurial was extremely gloomy and severe, and, in fact, a more austere spot could scarcely have been found. If they took away the cupola which surmounted the great church and the towers at the four corners they could imagine it a barracks. It was a mixture of palace and convent and great church. It was built of granite, and the moment one passed through the door one felt a chill pass through one. There was nothing beautiful; but he could not say there was nothing elevating, because the great church was one of the most impressive structures he had ever been in. The whole construction of the Escurial was symbolical of the mind of Philip II.

Mr. Frith said that Mr. Lee had referred to the noble and elevated thoughts which symbols gave rise to in the minds of those who understood them and felt their power. He thought that condition on the part of worshippers was very much to be encouraged.

The Rev. E. W. Hines said he had been struck in looking round churches with the fact that individualism on the part of workers might be more encouraged. He knew a church built in modern times, but there were only representations of two figures in the whole of the thirty or forty corbels. They were repeated all round the church in a monotonous manner. He thought they should encourage a little more effort and a little more individuality in this direction. He would also like to know whether there was any representation of Christ on the crucifix, not in his agony, but robed and crowned.

Canon Bristow said there was a very fine specimen in the Church of St. Mary, Bathwick, near Bath.

The Chairman said he did not altogether agree with Mr. Lee as to the origin of some of the ornaments. For instance, in the fifth and sixth century in the Roman Church the clergy wore no distinctive dress, but only the dress worn by persons in high places. Well, that Church was very conservative—and he thought it was probable that the clergy clung to their dresses, and as these dresses got out of fashion amongst the laity, they began, in the eyes of the people, to assume a distinctive form, and, in course of time, their origin was forgotten. Then the artistic mind came in and suggested that there was a sacred meaning in the robes to those who had eyes to see it. That was what it seemed to him in a large number of cases actually happened, and he thought they were much indebted to the artistic mind for helping them in those interpretations.

Mr. Lee said he did not touch on clerical robes, but he did say they were symbolical in the early church. Nothing surely could be clearer than the way in which the robes of the High Priest were ordered, and every part of that robe was symbolical.

The discussion closed with a vote of thanks to the chairman.

ASSOCIATION OF MUNICIPAL AND COUNTY ENGINEERS.

A HOME counties district meeting of the members of the Association of Municipal and County Engineers was held at the Town Hall, Newbury, on Saturday, May 31. Mr. E. G. Mawbey (Leicester), President, occupied the chair, and there were present Messrs. W. Weaver (Kensington), W. N. Blair (St. Pancras), P. G. Kellick (Finsbury), W. Harper (Cardiff), J. Lemon (Southampton), R. J. Thomas (Aylesbury), W. Banks (Rochester), A. J. Dickinson (Long Crendon), T. H. Pollard (Windsor), G. Fitton (Basingstoke), T. J. Guilbert (Guernsey), and others.

The Mayor (Alderman J. Rankin, J.P.) received the members, and said the municipalities much appreciated the services of their municipal engineers, who assisted them so much in the carrying out of those important schemes which were necessary for the health of the community.

The President moved a vote of thanks to the Mayor for his reception of the Association, which was accorded with acclamation.

Mr. S. J. L. Vincent, Borough Surveyor, read a paper on "Newbury Municipal Work." He said the population was 11,600 and the rateable value 40,500*l*. There were 7¼ miles of main roads in the borough (the Berkshire County Council contributing 1,250*l*. per annum), and about 11 miles of streets and roads other than main roads. For the main roads, Clee Hill granite, broken to 1½ in. gauge was use, the roller being a 10-ton Aveling & Porter. For the other streets and roads, local gravel, hand-picked flints, and Sarson stone were used. In June, 1900, the roadway on two sides of the municipal buildings was paved with Karri blocks on a bed of Portland cement concrete 9 in. thick gauged 5 gravel to 1 cement; area 474 yards, cost 309*l*. During the last three years about 12,000 yards super of concrete footways had been laid, at an average cost of 3s. 4d. per yard superficial. The footways were laid *in situ*, the thickness being 2¾ in., the bottom 1¾ in. being compose of 4 parts local shingle gravel (¾ in. gauge) to 1 part Portland cement; and the top

1 in. 2 parts fine beach shingle (⅜ in. gauge) to 1 part Portland cement. The main sewerage system of the borough was designed by the late John Anstie, and carried out by him during 1894, 1895, and 1896. It was entirely on the "separate" principle. There were 13 miles 2 furlongs of sewers. The main sewer at the receiving well was 16 in. in diameter, the other sewers ranging from 12 in. to 8 in. The whole of the sewage flowed by gravitation to the receiving well at the pumping station, whence it was pumped by three 7-in. centrifugal pumps to the outfall works 2¼ miles away, the power being supplied by three gas-engines, two 12 h.-p. and one 7 h.-p. The charge of gas for pumping is 2s. 4d. per 1,000 ; this equalled a cost of 1d. per 2,700 gallons. There were twenty-four automatic flushing tanks at work fed from the mains of the water company. The ventilation of the sewers was effected by surface gratings (open man-hole covers) and shafts, of which they had now sixty-four of 4 in. diameter, and fifteen of 6 in. diameter. At the outfall works the installation consisted of six precipitation tanks and a complete set of sludge-pressing plant, the land being about 11 acres in extent, of which one half was underdrained. The total cost of the system was 30,115*l.* Since his appointment in May, 1897, considerable extensions had been made to the sewers, and the system of treatment had been altered. Up to December, 1899, the whole of the sewage was treated chemically and passed through precipitation tanks. Having visited works where bacteria beds were in successful operation, he suggested to the Main Drainage Committee in October, 1899, the advisability of converting one of the precipitation tanks (60 ft. by 24 ft. by 4 ft.) into an experimental bacteria bed. This was done by filling it up with furnace clinkers ; sewage was passed into it in December, 1899. The results were so satisfactory that two other tanks were converted in the following March, a change being made, however, in the material used, the manager of the works having suggested a trial of clean, sifted shingle dug from a portion of the land at the works. These two beds proved even more satisfactory than the clinker bed, so that after six months' working the author induced the Main Drainage Committee to construct a sufficient area of bacteria beds to treat the whole of the sewage bacteriologically. Accordingly, five concrete tanks of a cubical capacity of 260 yards each (60 ft. by 24 ft. by 5 ft) were constructed, and filled with gravel. They were first charged on June 24, 1901, and have worked continuously ever since. They were worked on a six-hours cycle (*i.e.*, filled four times in twenty-four hours). The use of chemicals and the work of sludge-pressing ceased on the same day, the saving in these two items being over £300 per annum. The capacity of these gravel-beds when first charged was one-half the total cubical contents of the empty tanks ; after a few days this had shrunk to one-third, and at the end of three months to one-fifth, at which figure it had remained since. The effluent was passed over the land, and had proved satisfactory to the Thames Conservancy analyst. It had proved that these beds did not deal with the whole of the sewage, but with only 220,000 gallons out of a total flow of 340,000 gallons per twenty-four hours ; consequently, one of the precipitation tanks was still used for the surplus flow, the sludge which accumulated being passed into a prepared bay on the lowest portion of the land. The cost of these beds (£4,100) was paid out of current account. He proposed next winter to construct additional beds to deal with the surplus. As regards house connexions, a set of regulations was framed by the Main Drainage Committee and approved by the Local Government Board. These included the compulsory provision of an intercepting chamber to each connexion with the sewers. In December, 1897, he obtained consent of the Roads Committee to prepare plans for a depôt, there being no adequate accommodation for the carts and plans, and the stabling being unsatisfactory. The plans were approved by the Council, and had been carried out. The accommodation comprised stabling for nine horses (including loose box) with loft over, office, harness-room, cart sheds, blacksmiths' shop, wheelwright's shed (and shop over loose box) house for foreman, steam-roller house, &c. The principal Corporation property consisted of municipal buildings (erected 1876, with the exception of the old town hall), comprising a council-chamber, police-court, town hall, committee-rooms' retiring-rooms, offices of surveyor and caretaker's apartments, fine corn exchange, having a floor space of 160 ft. by 50 ft., the technical institute, cattle market, and a considerable number of cottages. The Council erected in 1896 a corrugated iron hospital on an isolated site about two miles from the centre of the town. This had up to the present year met all requirements. As the Rural District Council had now joined with the Corporation in providing "joint" accommodation, four more wards had just been added, so that the new hosiptal contained two nurses' rooms, kitchen, and scullery ; six wards, two for scarlet fever, two for typhoid fever, and two for any other disease (except smallpox) which might require isolation. The total cost of the whole place had been 975*l.*, plus 680*l.* for removing the old buildings. The town was surrounded by four commons, which were within half-an-hour's walk of the centre of the town. In addition there were four open spaces available for recreation, but which could not be laid out in any way owing to the fact that there are commonable rights attached to each. There were two open-air swimming baths owned by the Corporation, with dressing-rooms and appurtenance. The water supply was in the hands of a private company. Samples were taken for chemical and bacteriological examination twice a year, the result being highly satisfactory. The water, however, was very hard (24 deg. Clark's scale). In March, 1900, he was asked by the Rural District Council of Newbury to prepare a scheme for dealing with the drainage of the village of Donnington, situate just outside the borough boundary, the total flow to be dealt with being about 3,000 gallons per twenty-four hours. Plans were prepared showing sewers gravitating to a chamber at the lowest point of the village, containing two Shone ejectors of 50 gallons capacity, the ejectors being worked from a small station within twenty yards of the chamber. The scheme was approved by the District Council and the Local Government Board, the work being completed by Christmas last at the cost of 2,000*l.* The sewage was ejected through a rising main, 760 yards in length, 5 in. in diameter, into the nearest point of the Corporation system. All works of sewer extension, road-making, paving, repairs to property, &c., were executed by direct employment of labour ; the Council, on his recommendation, having recognised that for these works this method of procedure was the best and cheapest.

Mr. J. Lemon, Southampton, in moving a vote of thanks, mentioned that twenty-four years ago he was employed by the Corporation of Newbury to prepare a sewerage scheme for the borough. When he got there he found that more than half the town was outside the municipal boundary, and he advised the Corporation that the first thing to do was to extend the borough boundary. He was told the outside authorities would refuse to join, but he saw them, found they would join on terms, and in the end prepared a scheme for the extension of the boundaries which passed both Houses of Parliament. A new Council had to be elected, as the new area was so different. He submitted his sewerage scheme to one of the first meetings of the new Council. A councillor got up and moved that the question of the drainage of this important borough be adjourned *sine die*. That was duly seconded, put to the vote, and carried, and he was done with. They said, as a kind of solatium, "It is all right, Mr. Lemon ; you will be paid." And he must say, for the honour and credit of Newbury, that they paid without grumbling. Some time afterwards they advertised for schemes and tenders, and Mr. Anstie was appointed Engineer and carried out the works. With reference to the bacteria beds, he could not understand how it was that the capacity had gone done to one-fifth. The only conclusion he could come to was that no adequate precaution had been taken to intercept the detritus which found its way into the beds.

Mr. Weaver, Kensington, who seconded, said it was gratifying to visit the smaller towns and see the work done by the young members of the Association who were coming forward in the ranks to take the place of the older members as they disappeared. He thought it was a mistake to have unchannelled roads both from a sanitary and economical point of view. He noticed that the only wood paving in the town was some Karri wood, and he thought if they waited for their experience of that wood before extending it they would not extend it in that material.

Mr. W. Harpur, Cardiff, said he noticed Mr. Vincent said he could do the work of the town better and cheaper by direct labour than by contract. He thought it the right principle for every municipality to do its street work by direct labour. They might be sure of having value for the money they expended when they carried out their own work, and that could not always be said of contract work.

Mr. W. N. Blair, St. Pancras, thought some further explanation was due from Mr. Weaver with reference to his remarks about Karri wood. Did he mean that they might have to wait so long before any result was visible that they would be precluded from using any more ; or, on the other hand, was his opinion adverse to it?

Mr. W. Weaver said he was certainly adverse to the use of Karri wood paving. He did not say it would wear out, but if they looked at the paving outside that hall, which had been down two years, they would see that the cross joints had already opened one-third of an inch. That was the fault he found with Karri wood. He predicted that before the paving had been down for four years it would be as bad and noisy to drive over as a granite road.

The President supported Mr. Harpur's view as to doing work by direct labour, and mentioned that he was carrying out a great tramway scheme in Leicester by direct labour. He could not agree with Mr. Weaver's remarks as to Karri wood, as he had a very good experience of hard wood in Leicester, where it had worn very well.

Mr. Vincent, in reply, said the bacteria beds had shrunk to one-fifth of the total capacity, but the shrinkage was not now going on. He attributed it to the effect that there were no primary beds, and that the crude sewage had to be put on the beds. As to the Karri wood wearing, he did not think he would be in Newbury to see it wear out.

The members visited the outfall, the bacteria beds, the gasworks, and the town depot ; and at the conclusion of the round of visits were entertained to tea at the Town Hall.

ENGINEERING SOCIETIES.

SOCIETY OF ENGINEERS.—At a meeting of the Society of Engineers held at the Royal United Service Institution, Whitehall, on Monday, June 2, Mr. Percy Griffith, President, in the chair, a paper was read on "Some Twentieth Century Locomotives," by Mr. Charles Rous-Marten. The author first pointed out that a large proportion of the locomotives employed on British railways were twenty years old and upwards, many were from thirty to forty years, and some still older. British engines only twenty years old are regarded as comparatively modern, whereas twenty years old American locomotives are deemed archaic. He observed that some of those elderly British engines did most important work on the leading railways of the Kingdom, having been repaired, renewed, and rebuilt, until they were virtually new machines, but necessarily deficient in the power demanded by the requirements of modern traffic. Hence, he said, on certain lines piloting was carried to wasteful excess. In other instances, the loads for the older engines were limited to five-sixths of that given to modern engines. That involved using six engines to do the work of five, and running six trains instead of five on roads already badly overcrowded, besides increasing the labour cost and other working expenses. This remarkable survival of elderly locomotives undoubtedly demonstrates the original excellence of their design and construction. American practice employs, in some respects, inferior materials—according to British ideas—and builds much more roughly and rapidly, the engines not being expected or desired to last more than ten or fifteen years. It is then preferred to replace them by new locomotives fitted with all modern improvements and possessing a large margin of power, especially in the boiler, such power being available in case either of ordinary need or special emergency. The author considers that it is debatable whether, on the one hand, the extreme longevity of British locomotives is desirable, involving, as it does, the crowding of the lines with old and sometimes almost obsolete locomotive types deficient in power proportionate to modern requirements, or

whether, on the other hand, American practice, while unquestionably superior in respect of providing a larger margin of power, is not defective in its results through being wasteful in coal consumption and increased cost in repairs, in consequence of inferior material being used and of a rougher mode of construction being adopted. Each plan, he observed, has its own special advantages and disadvantages. British engines were shown to be indisputably superior to American per unit of power, but American designers provided more units of power for identical duty. These comparisons apply solely to American locomotives working in Britain or British dominions. But latterly the influence of the one feature in which American and European practice was unquestionably superior to British was seen in the vastly enhanced power, especially in the boilers, supplied to most recent British locomotives, as shown by contrast between prominent types of British locomotives of 1901 and 1902 with the leading standard types of 1895. Another result of American and European Continental influence in British practice was stated to be a tendency to multiply coupled wheels, as in the case of six-coupled wheels instead of four for passenger service, and eight instead of six for goods traffic. In conclusion, a summary was given of the leading features of modern British types of engines and the general characteristics of twentieth-century locomotive practice in Britain.

Illustrations.

THE WESTMINSTER DORMITORY.

THESE measured drawings were made in accordance with the conditions accompanying the award of the Banister Fletcher Bursary, which was founded in 1901 for the study of seventeenth and eighteenth century buildings in London. The report, dealing in full with the history of the building, forms a special article in this issue. The whole is the work of Mr. Arthur Stratton, A.R.I.B.A., of London, the first holder of the Bursary.

HOUSE, SHIREOAK, HEADINGLEY (NEAR LEEDS).

THIS is a house built some years ago from the designs of Mr. F. W. Bedford, of Leeds. Owing to the absence of the architect from home we are not able to give any details, but the plan sufficiently explains the general design.

THE NEW HOLBORN BATHS.

THE new Holborn baths, of which the frontage and entrance are in Broad-street Bloomsbury, were formally opened on Tuesday afternoon by the Mayor of the Borough of Holborn, before a considerable concourse of invited spectators congregated in the gallery of the new swimming bath.

The new baths are really an extension, as will be seen from the plan, of the old baths of which the entrance is in Endell-street, and with which they are internally connected. The Endell-street swimming bath now becomes the second-class swimming bath, the fine new one in the Broad-street building forming the first-class swimming bath.

After the contract for the new building was signed, a long time was spent in removing old buildings and preparing the special foundations, which proved necessary in consequence of the excavations showing the unsatisfactory nature of the subsoil throughout. Below the whole of the new swimming bath cement concrete walls, placed at intervals of about 6 ft., start from the hard natural ballast, and support the thick layer of concrete forming the bottom of the bath.

The plan shows the general arrangement; the new walls being tinted black and the original ones hatched. The new building is entered from Broad-street through collapsible gates, which will be run back when the building is open, and will be drawn across the entrance when the place is closed. Through swing doors the vestibule is reached, and then the small hall containing the staircase leading to the gallery. A pay-office, lighted by external windows, is placed on the east side of the vestibule. Through a second set of swing-doors the large hall, containing the first-class swimming-bath, is entered. A staircase at the north end of this hall leads up to club-rooms on the first floor, and another staircase leads into the basement. Bathers can reach the north from the south end of the bath through the electrically-lighted east subway, without passing along the platform; and a staircase has been placed at the north-east corner of the hall for reaching the subway from the south portion of the building.

In the front portion of the ground story is a committee-room, with separate entrance from the vestibule, and separate lobbies, lavatory for members of committee, &c. Rooms for the use of swimming clubs have been provided. On the first floor, next Broad-street, there are two such rooms, which have been so arranged that three rooms may be made, all with separate accesses, &c., if that should be advisable hereafter, and there are also two club-rooms in the basement. All these rooms are reached by special fireproof staircases, placed at the north end of the new bath.

In the completed building there are two residences on the second floor, one for the superintendent, next Broad-street, and the other for the engineer, next Endell-street. The first is reached from an entrance in Broad-street, and by a separate staircase on the east side of the building. The other residence has a separate staircase leading up from an entrance doorway in Endell-street.

A new 6-in. main is brought from Broad-street for the supply of the new building. More rapid filling of the new bath will result from this method and size of supply. All the water will be supplied through meters. The New River Company has, in a liberal spirit, agreed to supply water for filling the new swimming bath at 6d. per 1,000 gallons. The condition made by the water company is that the delivery is to be made at a point not exceeding 60 ft. above Trinity high-water mark. Hydrants for the extinction of fire have been specially arranged for at the north and south ends of the new bath. Supplies and hose have also been arranged for washing down the surfaces of the platforms, dressing-boxes, &c.

As all the three boilers were defective—two of them practically worn out, and the third much pitted and needing a good deal of work to make it last a few years—it was determined to replace the three old boilers by two new powerful steam boilers, each 24 ft. long and 8 ft. diameter, built of steel, capable of being worked daily at 90 lbs. pressure, with all the most recent improvements, and on new seatings. The provision of the twin boilers will enable the work of the baths and washhouses to be carried on with confidence and without risk of breakdown. Being coupled up to all the mains, the boilers can be used alternately, and will thus be worn evenly, or they can be used in conjunction in times of pressure. When one must be put out of use for cleaning or minor repairs, the other, being of equal power, can do all the work till the second can take its turn. The boilers will supply steam for heating the two swimming-baths, for heating hot water for private baths and the laundries, also for all the power required in the laundries, including the forced air drying-closets, &c.

Duplicate boilers for supplying steam having been provided, it was considered desirable to carry similar reasoning further, and to duplicate also the appliances for heating water. The two heaters and reservoirs are of steel, and are placed in a chamber in the basement specially devoted to and prepared for them by underpinning walls, new drainage, &c. This arrangement has been decided upon in order that the heaters and reservoirs may be reached readily for inspection, cleaning, &c. The larger heater has 102 copper tubes. The reservoirs and heaters will store when required over 2,000 gallons of hot water for the laundry and private baths; one heater will be in use at a time, but the other will be equally available as both are coupled to the mains; and it is highly improbable that duplicate appliances recently put in and intelligently used can fail at the same moment, an accident which would throw the whole scheme out of work is practically impossible. In carrying out this work the defective condition of some of the old appliances was made apparent, and although there has been no attempt to renew everything, many alterations have been made in order to secure efficiency.

The water in the baths is warmed by "the silent heater system." Steam at considerable pressure is brought into contact with water and parts with latent heat. In a comparatively short space of time the water, supplied from the mains of the New River Co., is raised to the 72 deg. or thereabouts which is the comfortable warmth for the water in a good swimming-bath. Heat is lost after a time in consequence of cooler air playing upon the water, &c., and then the circulating system is brought into use by opening a valve. Chilled water passes through the circulating main, is warmed by steam passed through the silent heater, and comes again into the bath at a higher temperature. This can be done at any time, and the requisite temperature maintained; the whole body of water being so mixed up that, in testing, the thermometer will show throughout the bath a difference of less than 1 deg.

The air in the new swimming-bath will be heated by radiators placed at its north and south ends through which steam will be passed. The chill will thus be taken off the air, which will be kept at an even temperature of about 60 deg. By lines of steam-pipes placed at the bottoms of the lantern lights, the temperature near the glass will be raised, and it is believed that condensation on cold surfaces will be prevented. This heating of the atmosphere, besides being pleasant for the bathers, will also prevent rapid chilling of the water; and another advantage may be the shortening of the time for keeping the bath closed in cold weather.

It was resolved that there should be such a general resemblance between the two street fronts of the building, namely, the old one to Endell-street and the new one to Broad-street, as will suggest to an observer that they form part of the same building. Broad-street is of considerable width, and the building being much in view from important points, a liberal use of Portland stone was sanctioned, with T. L. B. red bricks of bright cherry-red for the general surfaces—the style being astylar Renaissance.

The hall containing the new bath has a total size of 105 ft. by 44 ft. and a height from the surface of the water of 35 ft. There is a gallery round all sides of the bath with open iron railings by Mr. Shrivell. The north portion of the gallery is 9 ft. wide and will be used as waiting-room for the swimming bath. The dressing boxes and other wood enclosures occupy the space under the gallery on the east and west sides. The gallery on the south will be merely a passage gallery, so is only 5 ft. 6 in. wide. The water chute, spring boards, running spring, teak ladders for going into and leaving the bath have all been supplied by Mr. Newman, the well-known swimmer, now superintendent of the Westminster Baths.

The walls of the Hall containing the bath are from the level of the platform lined with glazed brickwork, salt glazed bricks being used for the walls below the gallery level, and green glazed bricks for the parts above that level. The cleaning of the bath hall in the future will thus be easy. The walls of the bath pond are heavy masses of concrete, lined internally with Limmer asphalte put on in two thicknesses. The surfaces of the asphalte were roughened before hardening by the application of coarse sand. Inside the asphalte is a lining of glazed brickwork, laid and jointed in cement. The scum-trough, forming the overflow from the bath, is of moulded glazed pottery. The water in the bath will be freshened by means of the sparging pipe at the south end. By its action any scum on the surface will be driven to the trough at the north end, which will thus be at once overflow and scum-trough.

The bottom of the bath is paved with Venetian mosaic finished in hard Sicilian marble, with black lines for guidance in swimming under water. All the surfaces of the mosaic are polished. This jointless floor will facilitate the cleaning of the bath pond; a matter of considerable importance as very frequent changing of the water in the pond is proposed. The surfaces of the platforms round the bath pond slope away from the pond, and channels are formed in front of the dressing-boxes, so as to avoid risk of water rendered muddy in cleaning the platforms finding its way into the pond. The bath margins are of smooth Keinton (Somerset) stone of a light blue colour, much used in the west country; and the remainder of each of the platforms is paved with Rust's Vitreous Mosaic, an extremely hard material with non-slippery surfaces. Open channels are used throughout where possible in preference to pipes; thus in the floors of the subway channels, formed in

granolithic, take roof water, wastes from channels in platforms over, &c.

The woodwork of the dressing-boxes is covered with three coats of Japanese lacquer.

The lighting of the hall is by upright windows forming a continuous lantern, and there is also a series of windows high up on the west side, skylights being avoided throughout. The domes, beams, coves, ribs, panels, &c., are in fibrous plaster, painted and flatted. Heating pipes at the bottom of the lantern lights will, it is hoped, prevent condensation on the surfaces in that part of the building, as the atmosphere will be heated by steam pipes placed at the bottom of the lanterns just described. There will also be radiators placed at the north and south ends of the hall. The artificial lighting is wholly by electricity; four powerful arc lamps hang over the pond, and there are also numerous Edison and Swan incandescent lights against walls, in front of gallery, and in lobbies, &c. A few gas-lights, sufficient to prevent the building being dark at any time, are provided; these gas-lights will serve as a sort of "stand by" to the electric lighting.

The amount of the original contract was 13,434*l.*, but this has been considerably exceeded by work not at first contemplated. The general contractors are Messrs. Gough, of Hendon.

In addition to their own workpeople, Messrs. Gough & Co. have employed, for boilers and engineering work generally, Messrs. Fraser & Fraser, of Bromley-by-Bow; for ironwork of staircases, Messrs. Allen & Co.; for constructional steel, the Cadogan Ironworks Co.; ventilation, Messrs. Strode & Co., R. Crittall, and C. Kite & Co.; sanitary fittings, Messrs. G. Jennings; wood block floors, Messrs. Duffy & Co.; fibrous plaster, Mr. Gilbert Seale; chimney-pieces, Messrs. Shuffrey & Co.; electric lighting and gas, Messrs. Strode & Co.; Japanese lacquer, Rhus & Co., &c.

Messrs. Lawrence & Sons, of Bracknell, supplied the red bricks; the Farnley Iron Co. the glazed bricks with which the swimming-bath hall has been lined, including ivory-white bricks for walls of the bathing-pond, salt-glazed bricks for the walls up to the gallery level, and C. T. green bricks for the walls above the gallery. The floor of the large new bath is of Venetian terrazzo, executed by the Art Pavements and Decorations Co. The platforms round the bath are paved with Rust's Vitreous Mosaic in two greens, and the entrance hall, &c., in red. The margins next the bath are of Keinton stone, supplied by Mr. Clothier, of Street. The floors of the dressing-boxes themselves are of Stuart's granolithic, executed by the workmen of the company. The paving of the galleries, subways, and the surface-channels throughout, are also of granolithic.

Messrs. Clarkson, of London, are the architects; their plans were selected in competition.

Mr. H. Butler was the clerk of works.

The new swimming-bath, in appearance and in general structure, is no doubt one of the finest in London; the only criticism we should make on it is that we do not quite like the dark mass formed by the fronts of the dressing-boxes. Everything around a swimming-bath should be bright-toned, if possible; as all masses of dark more or less affect the look of the water surface by reflection. The white domed ceiling is very satisfactory, and we prefer it to ceiling lights, in which there is an element of danger from the possible breakage and fall of glass.

BATTERSEA WORKING-CLASS HOUSES COMPETITION.

DESIGN No. 5 provides for three self-contained tenements, containing living-room three bedrooms, and scullery, &c., on each floor.

In this case it was thought to be more economical to provide a common staircase with two tenements on each floor off the same landing: an entrance door being provided on the ground floor, and also an inner entrance door for each tenement. This building could be repeated to any extent, and it is planned to be adapted to a five-story dwelling if required.

Externally it is proposed that it should be faced with red brick, having a base of darker coloured bricks to the height of the ground-floor window-sills, the window frames being painted white, with the exception of the upper ones, which would be painted green against the rough cast to obtain a contrast.

The second floor is projected so as to form a cornice and to carry the eaves gutter and Mansard roof, the soffit of the cornice being plastered and lime-whited.

The roof, including the portion between window-sills and eaves, would be covered with green slates, and the space between the windows rough-casted, forming a white frieze, the window-frames being painted green, as already mentioned.

The contents of this building, taken to a depth of 6 ft. 6 in. below the ground-floor level, and including chimneys above roof, is 26,631 cubic ft., and the estimated cost 891*l.*

SMITH & WEALD.

THE SANITARY INSTITUTE:

CORONATION DINNER.

THE Coronation Dinner of the Sanitary Institute was held in the Venetian Room of the Midland Grand Hotel, St. Pancras, on Monday evening, under the presidency of the Duke of Northumberland, K.G., Vice-President, who was supported by Sir Joseph Fayrer, Bart., K.C.S.I., Sir Francis Sharp Powell, M.P., Sir W. H. Preece, K.C.B., Sir Henry Norbury (Director, General Naval Medical Department), Sir S. E. Scott, M.P., Mr. A. Wynter Blyth (Chairman of Council Provident Incorporated Society of Medical Officers of Health), Surgeon-General W. Taylor (Director-General Army Medical Department), Mr. H. Ward (Chairman L.C.C Technical Education Board), Mr. C. Hudson (Master of the Plumbers' Company), the Master of the Carpenters' Company, Mr. C. Hawksley (President Institution Civil Engineers), Mr. H. T. Hare (President Architectural Association), Mr. E. Barnes (Mayor of St. Pancras), Mr. R. M. Hensley (Chairman, Metropolitan Asylums Board), Professor A. Sheridan Delephine, Professor Corfield, and Mr. E. G. Mawbey (President of the Association of Municipal and County Engineers). The general company included Dr. Egglestone Burrows, Dr. S. Rideal, Dr. H. R. Kenwood, Mr. Isaac Shone, Dr. E. C. Seaton, Dr. C. Childs, Professor Henry Adams, Mr. W. N. Shaw, F.R.S., Professor Henry Robinson, Mr. J. Smith, Mr. T. W. Cutler, Dr. Louis C. Parkes, Mr. J. Osborne Smith, Dr. J. Shimeld, Dr. A. W. Harris, Dr. J. T. C. Nash, Colonel J. Lane Notter, Mr. E. White Wallis (Secretary, the Sanitary Institute), Dr. F. Angles, Dr. P. Boollyer, Dr. T. E. Hill, Dr. A. Newsholme, Dr. J. F. J. Sykes, and Mr. T. de Courcy Meade.

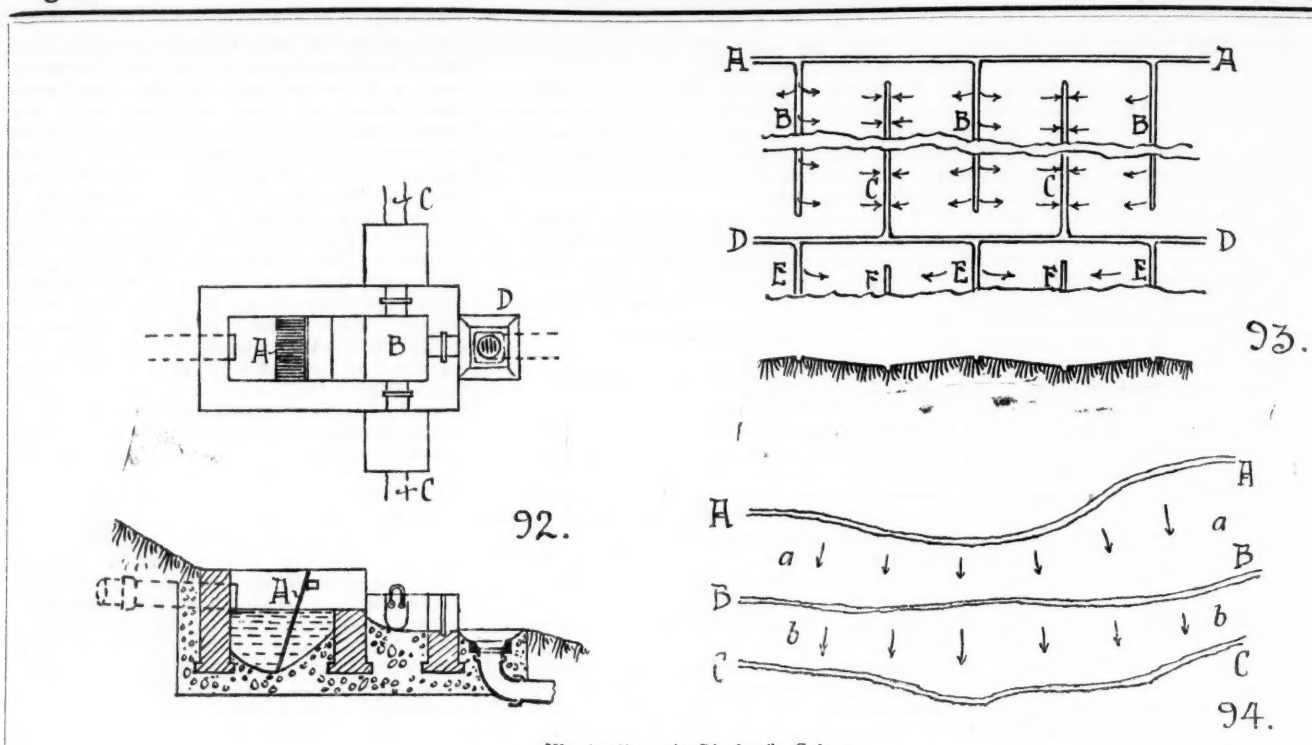
The Chairman proposed the toast of "The King," remarking that, as members of that Institute, they remembered especially the services which his Majesty had rendered to sanitary science in the course of his life. They would all remember, in the first place, how very great an interest he had taken in the housing of the working classes, which touched so large a field of sanitary science. He presided over the Health Exhibition of 1883, and the International Congress of Hygiene.

"The Queen, Prince, and Princess of Wales, and the other members of the Royal Family," were next toasted, and then followed the toast of the "Navy, Army, and Auxiliary Forces," and the "Houses of Parliament," the former proposed by Mr. H. Ward, L.C.C., and the latter by the Mayor of St. Pancras (Mr. E. Barnes). Mr. Barnes mentioned that the administration of the health department in St. Pancras cost 40,000*l.* a year.

Sir F. S. Powell, M.P., responding for the "Houses of Parliament," remarked that the housing problem would occupy the attention of Parliament for many years to come. Overcrowding, no doubt, existed to an enormous extent in some parts of the kingdom, but there were places, notably Leeds, where the accommodation was abundant. There the growth of the population had been enormous; still the difficulty of overcrowding had been successfully dealt with. There were upwards of 3,000 uninhabited houses in the city of Leeds, and although the municipal authorities might have to take greater heed respecting those houses, still, there was no want in the place. He pointed out that there had been a great deal of legislation with regard to housing, and he argued that the condition of affairs in many places would not be so bad if the existing law were put into force. Legislation must be slow, but administration could never cease, and one of his greatest hopes for the future was in the power of administration.

The Chairman proposed "His Royal Highness the Duke of Cambridge, President, and the Sanitary Institute." He found his Royal Highness had for over twenty years been connected with that Institute. He was for many years a Vice-President. He (the Chairman) would dilate not upon the great work the Institute had done, but rather upon what it had not done and what it desired to do. In the museum what struck him most was what was missing. The place was too crowded, and it was somewhat distressing to see a room full of objects so judiciously chosen set out to so little advantage. He had been struck by another thing. No doubt the objects of that museum were most interesting; no doubt they fairly represented the different classes of objects or subjects which they wished to bring before the public; but he was sure of this, that they could display those objects to much greater advantage if they had more room; therefore, he thought one of the first duties which they had as an Institute was to find a better habitation. He was pleased to tell them that for that object 8,000*l.* had been already raised, and he hoped by the contribution of other funds they would have a museum worthy of the Institute and of the serious and important interests which the museum was intended to represent and which the Institute was formed to promote. He was glad to be able to congratulate them upon the extension of their work to other countries, especially in the conduct of examinations. He was also, he thought, justified in congratulating them upon the interest that the Institute took in the great sanitary movements of the day. There was one which he might mention, because it was coming before the public; he meant the question of Housing of the Poor. He was afraid Leeds, about which they had heard something from a previous speaker, was not quite an example of all the towns; therefore he would like to say one word of warning against relying too much upon the House of Commons. There were symptoms that the public always expected legislation to do everything they wanted. Far more could be done if Local Authorities would summon up courage to do all the law already allowed. He hoped the members of that Institute would protest against the tendency of municipalities to talk over proposals at great length, to refer them to committees, then to talk again, and then to postpone them to the next election for thet opinion of their successors. The Chairman next referred to the water question, which, according to his mind, appeared of the utmost seriousness, and one which was growing in seriousness every day. He was perfectly certain the question would never be solved until they recognised the fact that one kind of action was necessary in the country, and another in the big towns. The members of the Institute must study this question; they must take into consideration the very varying requirements of the different parts of the country, and they must not rely too much upon County Councils doing the work. They should rather incite the Local Authorities to take the matter up—teach them sound principles, and invite them to become the water-suppliers of the district concerned.

Dr. Wynter Blyth (Chairman of the Council responded. He claimed for the Institute that it was an educational, examinational, and scientific society, and had performed useful and important work, which was being extended every year. There was no doubt that the Institute had considerable influence on public opinion. They wanted more accommodation—they deserved more accommodation—and they appealed to the Empire, to the English-speaking people, for funds with which to enlarge their museum and extend their work. The value of the museum to students who came from different parts of the country could not be overrated. The noble Duke had already helped them, and he, as Chairman of the Council, thanked him for his gift. They ought to have a building that should commemorate those great men who had worked with them—such men as Dr. Richardson and Dr. Parkes. The speaker mentioned that they were about to have branches of the Institute in India and New Zealand, and he suggested in view of the extension of its ramifications that the society should be styled the Imperial Sanitary Institute. They did not alone consider the sanitation of the human race; they also considered the health of domestic animals. They applied hygiene to the horse and its stable, the cow in its shed, the dog in its kennel, and even that very much over-legislated animal the pig in its sty. With regard to the technical and practical side of diseases of animals, their Institute was probably the only place that could compare



Illustrations to Student's Column.

with the great Continental schools. Within their walls alone could an inspector obtain the equipment which would enable him to acquit himself with credit. Municipal authorities might depend that all who had passed the examinations of the Institute knew their duty.

Professor W. H. Corfield proposed the health of the Chairman, who, he said, had taken the keenest interest in the Institute, and the Duke having responded, the proceedings concluded.

COMPETITIONS.

NEW SCHOOL, GATESHEAD.—At a recent meeting of the Gateshead School Board the competition plans for the proposed school in Chester-street were considered, and it was decided that the three plans marked "Gloucester," "Ely," and "Canterbury" were the best. On the envelopes being opened, the authors were found to be :—(1) Mr. F. W. Purser, West-street, Gateshead; (2) Mr. Stephen Piper, Newcastle, and (3) Mr. H. T. Hodges, Newcastle. The Board, on further consideration, resolved to erect a temporary iron building to accommodate about 400 children, and to delay proceeding with the permanent school.

The Student's Column.

PART III.—PRIVATE SEWAGE DISPOSAL.

CHAPTER 22.—DISPOSAL ON LAND.

SEWAGE may be applied to land in various ways. It may be distributed over the surface to be utilised as far as possible by growing crops; in this case, the crops are an important consideration and govern to a large extent the application of the sewage. This method of disposal, known as "Irrigation" or "Broad Irrigation," was defined by the Royal Commission on Metropolitan Sewage Discharge as "the distribution of sewage over a large surface of ordinary agricultural land, having in view a maximum growth of vegetation (consistent with due purification) for the amount of sewage supplied." It is, therefore, essentially a branch of agriculture.

In the modification of this method, known as "Sub-irrigation," the sewage is conveyed to the land by means of pervious drains laid a few inches below the surface.

In a third method, the land is laid out into filtration areas, deeply under-drained, and the sewage is applied to the surface intermittently (generally by means of furrows), and is in part absorbed by vegetation growing on the ridges between the furrows, and in part filtered in passing downwards to the deep under-drains. This is known as "Intermittent Downward Filtration," and has been defined as "the concentration of sewage, at short intervals, on an area of specially chosen porous ground, as small as will absorb and cleanse it—not excluding vegetation, but making the produce of secondary importance."

All these methods have been adopted for the disposal of sewage from private buildings, and all have given satisfactory results under favourable conditions. On the other hand, where the conditions have been unfavourable, serious nuisances have arisen. It is therefore necessary to consider carefully the circumstances of each case before recommending one method for adoption.

The sewage from private buildings—other than trade effluents, which do not fall within the scope of these articles—differs chiefly in the amount of its dilution, and the question of sewage-composition, important though it is in the case of towns, does not here call for detailed discussion. The principal points to be considered are those relating to the land available for the reception of the sewage: (1) The nature and depth of the soil; (2) its area in proportion to the volume of the sewage, or to the number of persons contributing to the sewage; (3) the relative levels of the drains and of the land; and (4) the proximity of the land to the buildings. It will also be necessary to take into consideration the position of the watercourse into which the effluent drains (if any) must discharge. The position of shallow or deep wells must also be noted, and if the water from these is used for domestic purposes, the sewage ought to be treated at such a distance and in such a manner as to avoid pollution.

Light sandy soils, of considerable depth, are best adapted for the purification of sewage. In many districts the surface soil is only a few inches thick, and rests on a subsoil of clay. Land of this kind may be utilised for broad irrigation and sub-irrigation, but is quite unsuitable in its natural state for intermittent downward filtration. The bacteria, on which the nitrification of the sewage depends, are practically non-existent in clay subsoils; thus, at Rothamsted, they were not always found in samples taken at more than 3 ft. from the surface. It has been stated that no nitrification takes place in heavy clay soils at a greater depth than 18 in., while in the most porous soils it occurs at depths exceeding 4 ft. Other objections to clay are its impervious nature when moist and continuous, and its liability to cracks when dry. Sewage, absolutely unpurified, finds its way through these cracks, and also through holes made by worms, directly to the under-drains.

The area of the available land is also a governing factor in the selection of a method of land treatment. For broad irrigation the Local Government Board requires, in the case of towns, an area of 1 acre for every twenty-five persons if the soil is stiff clay, and one for every 100 persons if the soil is loamy gravel; for intermittent filtration through a sandy gravel soil, an area of 1 acre is required for every 100 to 300 persons, according to circumstances. Smaller areas are required if the sewage is precipitated before application to the land.

In many places, smaller areas of land in proportion to the population have been adopted than those just stated. On farms with suitable soils, the sewage of 200 persons per acre has been treated satisfactorily, and on suitable intermittent filtration areas the sewage from more than a 1,000 persons has been treated per acre. At Forfar, in 1879, the sewage from a population of about 15,000 began to be treated on 7 acres of land laid out for intermittent filtration and 17 acres laid out for broad irrigation, and the result appears to have continued perfectly satisfactory. According to a resolution passed by the Local Authority in 1880, the filtration areas alone had proved "capable of absorbing and cleansing the whole of the sewage of the burgh."

It is unwise, however, to restrict unduly the amount of land for private sewage disposal. Works of this kind are, as a rule, confined to rural districts, where agricultural land is plentiful and cheap; and even if a liberal allowance of land is given, the total area required is in many cases so small as to be scarcely worth consideration. Country houses have usually appertaining to them much more land than is required for the effectual purification of the sewage. The problem is a little more difficult in the case of large institutions such as asylums, but even here the cost of the land will be a comparatively small matter. When we remember that a plot of land rather less than 70 yards square measures an acre, and that this, if it is of a suitable nature and laid out for intermittent downward filtration, will suffice for the sewage of about 300 persons (according to the basis adopted by the Local Government Board), we shall admit that the area required for an ordinary country mansion is a mere trifle, and that the value of the land for receiving the sewage of a large institution is not a serious item. When, also, it is remembered that this land can still be utilised for the growth of roots, vegetables, &c., and its productivness probably increased, the land may be regarded as an investment of a not altogether unsatisfactory character.

It must also be borne in mind that the Local Government Board can enforce its demands only in the case of Local Authorities requiring its sanction for a loan, and further, that these demands are based on experience gained in the treatment of town sewage, much of which has been rendered difficult to purify by the inclusion of trade effluents.

If the ground is not adapted for intermittent downward filtration, a larger area may be taken and laid out for broad irrigation, or, if sufficient ground for this method of dis-

posal is not available, tank treatment followed by artificial or natural filtration may be adopted.

To utilise land for broad irrigation, careful preparation is, as a rule, required. It is an advantage to run the sewage into a small screening chamber, where grit will be deposited and coarse solids (paper, straw, &c.) retained. The screen may consist of a galvanised wire basket, through which the sewage flows and which retains the coarser solids, or may be a flat screen composed of ½-in. round iron bars about ½ in. apart, in an iron frame, as shown in fig. 92; the screen should be fixed in an inclined position, so that the solids can be easily removed by means of a rake. Fig. 92 shows a small grit-and-screening chamber of this kind, communicating with a three-way irrigation chamber B. The screen is shown at A; CC are open channels along the highest part of the irrigation area; D is the inlet to the drain (or open "carrier" of half-pipes or concrete) conducting the screened sewage to the lower portion of the irrigation area. Brick or concrete aprons should be provided at the outlets from the irrigation chamber, and small gates or paddles of wood, iron, or slate are required for stopping the semicircular openings which are not in use.

If the ground is nearly level, it must be carefully formed into beds to which a slight slope (about 1 in 100) must be given, so that the sewage will flow laterally over the surface or through the surface soil from the distributing to the collecting carriers. Different arrangements may be adopted. A common arrangement for clay land is shown in fig. 93. The main carrier A communicates with furrows B B B cut along the ridges of the beds, and the sewage flows laterally from them to the furrows C C in the depressions; these communicate with the collecting channels D D, from which the sewage passes again to the ridge furrows E E E, to be again picked up by the furrows F F. This arrangement may be repeated as often as required, but double or treble irrigation will, as a rule, suffice. More equal distribution of the sewage over the surface of the irrigated area, and more complete purification, can be obtained in this way than by simple irrigation. The ridges are usually about 40 ft. apart.

For sloping and irregular ground the "catch-water" system is adopted instead of the ridge-and-furrow arrangement just described. The sewage is led along a distributing channel cut at the highest convenient contour of the area to be irrigated, and other channels or furrows are cut along lower contours, as shown in fig. 94. The sewage is dammed up in the main carrier AA at any convenient point by means of a wood, iron, or slate stop pressed into the ground, and flows over the edge of the channel and down the slope *aa* to the next channel or furrow BB. This again is dammed where necessary, and the sewage overflows to the next slope *bb*, and passes to the third furrow CC. The number of furrows can be increased according to the nature of the soil and the slope of the surface. If the ground is steep, a greater proportionate area must be provided, as the sewage flows more quickly over it.

With either method of irrigation, it is absolutely essential that, *at least*, three separate areas should be laid out, so that the sewage can be applied intermittently to each. At certain stages of the growth of the crops, sewage, or excessive moisture of any kind, is very detrimental, and it is therefore necessary to arrange the crops on the different areas so that at no time will all the areas be thrown out of use. It is also highly desirable that, in addition to the irrigation areas, a small portion should be laid out for intermittent downward filtration, so that the whole of the sewage can on occasion be purified on this area. This is particularly necessary when rainwater is admitted to the drains.

The surfaces of the beds must be carefully graded, so that the sewage will flow as uniformly as possible to every part. Projections must be taken off and depressions filled up, and (on sloping ground) subsidiary furrows must be cut where necessary between the main furrows. Ponding of the sewage must be avoided, as this creates a nuisance.

It is sometimes said that the distinctive feature between broad irrigation and downward filtration is that in the latter the land is underdrained, while in the former it is not. This is only partially true. Some land with a deep and porous soil, not waterlogged, does not require draining, but in other cases the land must be drained in a similar manner to ordinary agricultural land. Agricultural drain-pipes, 3 in. and upwards in diameter, may be laid at suitable depths (varying according to levels of the land and of the outfall), and about 40 ft. apart. Care must be taken that the sewage must not pass directly to these drains.

Correspondence.

A QUESTION OF DISCOUNT.

SIR,—Would you or any of your readers kindly give us your opinion on the following matter? A provisional amount, as per enclosed extract from specification, is included in a certain contract we are at present occupied with, and we can conclusively prove that we have provided no additional amount on to this 2,000*l.* for our own profit, having relied upon receiving a discount through our clients of 5 per cent. to cover us for all work and risks we undertake in connexion with this item. We maintain there are risks, as we hold that in such a case we occupy the position of guarantors of our clients to the amount of this provision; as in the event of those clients finding themselves in a position of inability to pay for any work performed by the sub-contractors under this provisional amount, we are ourselves responsible to these sub-contractors direct. As we say, for this risk we are entitled to a discount; and as we can prove we have not included anything over and above this amount in the tender but kept the provision net, our clients should have no objection to this discount of 5 per cent. being allowed us by them on all amounts expended out of this provision. We may add that we acknowledge this custom ourselves by allowing the general contractor a discount ourselves in such cases, and we may further say that in this case the sub-contractor has refused to acknowledge us in the matter, and we have paid him his amount net. We had to take out our own bill of quantities, and nothing whatever is mentioned in the specification with regard to the contractor having to "add profit."

GOOD FAITH.

*** The following is the extract from the specification alluded to in the above letter:—

"*Prime Cost Allowance.*

Contractors shall include in the lump sum of the tender the sum of 2,000*l.* to provide for the cost of the coal handling plant, &c. . . . This amount shall be expended as and when the engineer shall direct, any portion of the amount not so expended being deducted from the lump sum of the contract."

BOOKS RECEIVED.

DECORATIVE BRUSH-WORK AND ELEMENTARY DESIGN. By Henry Cadness. (B. T. Batsford.)

ELECTRICAL INSTALLATIONS. By Rankin Kennedy, C.E. (The Caxton Publishing Co. 93.)

GENERAL BUILDING NEWS.

CHRIST CHURCH, WOBURN-SQUARE, W.C.—The Ecclesiastical Commissioners for England have made a grant of 1,500*l.* out of their common fund towards the cost of building a parsonage for this benefice. The church was built in 1833 after Vulliamy's designs, with a capacity for 800 persons. The interior was remodelled and reseated, by Hall, thirty years ago.

THE EDGAR HOME, BELFAST.—This institution, which was founded by the late Professor Dr. John Edgar in 1830, is now removed from Brunswick-street out to Whitehall, Ormeau-road. The committee last year purchased the mansion house, called Whitehall, together with two acres of ground, and it and the extensive buildings have involved an outlay of over 10,000*l.* There is provision for seventy-five inmates besides the officers of the home, and arrangements are made for carrying on laundry-work on an extensive scale. The additional premises at the home have been planned so as to take full advantage of the stone house which occupies one angle of the site. It affords accommodation on the ground floor for parlour, committee-rooms, chapel, and pantries. On the first floor are arranged matron's and assistants' rooms, with large dormitory. Above this level are placed servants' bedrooms and bathroom. The new buildings adjoining the foregoing have a frontage of above 150 ft. by 130 ft. They comprise on the ground floor a spacious corridor 90 ft. long, approached both from the new entrance porch and the former hall. From the corridor, access is obtained to the dining-hall, 40 ft. by 22 ft., with kitchen, scullery, and pantries adjacent. Behind these is the recreation hall, 40 ft. by 25 ft. A servants' dining-room is also provided. Ample provision is made for the extensive laundry department. Two receiving-rooms are placed adjacent to the hall, which also opens directly on the ironing-room, 60 ft. by 20 ft. The laundry is 40 ft. long, with large store-rooms at each end. Above the laundry are two large drying-rooms, 60 ft. long, with hoist. On the first and second floor are ranges of well-lighted dormitories, approached by fireproof stairs and corridors, and with lavatory accommodation. Two large boilers, with 90-ft. chimney, occupy part of the yard, which also contains stores and stabling. The walls are built of Belfast perforated bricks, rough dashed, with cement dressings. The boiler has been supplied by Messrs. Victor Coates & Co., Ltd. The plumbing and laundry fittings have been executed by Mr. John Dowling, Queen-street; and the terrazzo work by Mr. J. Ebner, London. The general contractors were Messrs. Courtney & Co., Ltd.; and the architects, Messrs. Young & Mackenzie, of Belfast.

CHURCH, DAIRYCOATES, HULL.—This church was opened on the 29th ult.; it is dedicated to St. Peter and St. Mary. The style is Romanesque, the nave arcading having semi-circular arches, supported on circular stone piers with moulded bases and carved caps. It is built of red bricks with terra-cotta dressings, the roof being covered with red Staffordshire tiles. There are two entrances, both on the north side, giving access from the Hessle-road, the main entrance having two porches with semi-circular modelled arches. The accommodation is at present provided for 558 persons. The chancel (which, when built, will accommodate a choir of forty) and organ-chamber are not yet erected. The contractors for the work are the executors of the late Thomas Southern, and the architects Messrs. Brodrick, Lowther, & Walker, Hull and Bridlington.

REOPENING OF LANDULPH CHURCH.—This church, which has undergone considerable restoration, was reopened on the 27th ult. In the work of restoration care has been taken not to introduce anything which would not harmonise with the ancient parts. The north wall had gone so much out of the perpendicular that it was found necessary to pull it down and replace it stone by stone. The fine old windows and the walls and roof outside have been thoroughly repaired. In the course of the restoration of the north side a doorway was discovered which had been plastered up. This has now been thrown open. In the interior the old oak ceilings of the aisles have been repaired. That of the nave is entirely new. Six dormer windows have been placed in the roof, and these much improve the lighting of the church. Near the altar have been discovered the places where in olden days the holy vessels were cleansed, and these interesting receptacles are to be thoroughly restored. The fifteenth century rood screen, on which is some very fine carving, is likewise to be renovated, and the old rood steps are still intact. The seats of the church had fallen into a ruinous state, and they have been removed and chairs substituted. Portions of the old seats are to be used in constructing screens for the chancel. The tower has been opened up, and the floor has been repaired with Delabole stone and wood. Altogether the renovations will cost 2,058*l.* The architect was Mr. G. Fellowes Prynne.

PRIMITIVE METHODIST CHURCH AND SCHOOLS, PETERSFIELD, HANTS.—The memorial stones of new Primitive Methodist Church and schools were recently laid at Petersfield. The buildings will be of brick, with Bath stone dressings, and will have seating accommodation for 200. The size of the church will be 37 ft. by 27 ft. The pulpit and pews will be of pitch pine, the side pews being fixed diagonally. The schoolroom will be 25 ft. by 22 ft., with movable platform. The windows will be of cathedral glass, with lead lights in front. The estimated cost of the whole, including the site, is 1,250*l.* Mr. T. E. Davidson, of Newcastle-on-Tyne and London, is the architect.

NEW CHURCH, RADSTOCK.—A new church has recently been opened at Radstock. The architect was Mr. W. J. Willcox, of Bath, and the contractors Messrs. Hodder & Son, of Frome.

EPISCOPAL CHURCH, BIELDSIDE, ABERDEEN.—The corner stone of this building was laid on the 27th ult. The church, already well advanced, is being built from plans by Mr. Arthur Clyne, Aberdeen. The style of the building is Gothic, with Scottish features, and the effect of the design will be enhanced by the character of the masonry, a combination of red and grey granites from Hill of Fare and Rubislaw quarries, respectively. A feature of the masonry also is the sparing introduction of fine or expensive dressings in the building, the surface of the stones for the most part being left quite rough, almost as they come from the quarry. The principal dimensions of the building are as follow:—Total length internally, 89 ft.; width of nave and chancel, 25 ft.; width across transepts, 53 ft.; height from floor to apex of barrel vaulted ceiling, 34 ft.; height from ground level to ridge of roof, 49 ft.; height of bell tower, 78 ft. The church will accommodate about 250, and provision has been made in the design for extension if desired, the addition of a north aisle and transept increasing the total accommodation to some 350 sittings. The estimated cost of the building is about 3,000*l.* The contractors are:—Carpenter, Messrs. Hendry & Keith; plumber, Messrs. Blaikie & Sons; slater, Mr. A. E. Merson; plasterer, Mr. A. Stephen; painter and glazier, Mr. E. Copland, all of Aberdeen; and the contractor for the masonry was Mr. F. Morrison, of Culter.

WESLEYAN SCHOOLS, MIDSOMER NORTON, SOMERSET.—These schools were formally opened on the 28th ult. They are erected on a site facing High-street, adjoining the Wesleyan Chapel. The infants' department is placed nearest the road, while the mixed department, with large assembly hall, stands on rising ground at the rear, a short covered corridor and flight of stone steps connecting the two blocks. In the infants' department there is provided a marching hall, 48 ft. by 16 ft. Three classrooms are provided. The mixed schools consist of a central hall 64 ft. by 30 ft., two cloakrooms, and five large classrooms, accommodation being provided for 336 scholars; and the plans admit of future extensions for 150 children. Mr. William F. Bird, of Midsomer Norton, was the architect, the contractor being Mr. W. Tovey, of Midsomer Norton, and the total cost, including purchase of land and furnishing, is about 4,700*l.*

WESLEYAN CHAPEL, ALDFIELD, RIPON.—The foundation-stones of a new Wesleyan chapel at Aldfield, in the Ripon circuit, were recently laid. The new structure will be entered from a porch on the east side, and will accommodate eighty-one adults. There will be two rows of pews, with an aisle down the centre, the rostrum being at the south end. At the opposite end to the rostrum, and entered from the porch, a schoolroom has been designed, and this will afford seating for fifty persons. The latter room is separated from the main building by a readily movable wood partition. The building is designed in the early Gothic style, and is to be faced on the east and north fronts with red pressed bricks, from Messrs. J. W. Green & Sons, Borough Bridge, and the roof is to be blue slated. Internally the walls are to be plastered, the seatings, dadoes, doors, &c., being in varnished pitch-pine. Mr. J. H. Coldbeck, Ripon, is the builder, and the amount of the contract is 478*l.* 10s. Mr. T. Stokes, of Thirsk, is the architect.

POST OFFICE, DUNOON, N.B.—New Post-office buildings, erected at Dunoon, were opened on the 28th ult. The builder was Mr. Colin Macandrew, of Edinburgh, and the architect Mr. John Breingan, also of that city.

HOME FOR INCURABLES, HARROGATE.—This home was opened by Sir Christopher Furness, M.P., on the 21st ult. The building, which is of Pateley Bridge stone, stands in Cornwall-road. It possesses a handsome frontage 157 ft. in length, and the depth of the building is over 85 ft. One of the features is a winter garden. The system of ventilation adopted enables the vitiated air to be drawn into the several chimney breasts at the ceiling level. The building has cost between 15,000*l.* and 16,000*l.*, and has been erected from plans prepared by Mr. T. E. Marshall, of Harrogate.

NEW BUILDINGS, TRINITY COLLEGE, DUBLIN.—The new Trinity College buildings, consisting partly of the Graduates' Memorial erected by the graduates, and partly of the new chambers for students, was opened on the 30th ult. The former is the outcome of the Tercentenary celebrations, and the latter, provided by the Board, have been joined in an architectural scheme, so as to form one block—the memorial building being in the centre, and the students' new quarters in the wings. This pile is situated on the site of what used to be known as "Rotten Row." It looks out on the Library square, and faces south. The buildings have a total length of 189 ft., an average breadth of 64 ft., a height at highest point of 82 ft. They are constructed of granite with dressings of Portland stone; and the style of architecture is Renaissance, with decided French leanings. The triplex idea in the construction is preserved in the south front. A centrepiece is formed by the memorial section, ornamentally roofed, which runs higher than either of the wings, and the wings in their turn have gable apexes, which are a reproduction on a smaller scale of that of the central building. Along the entire front on the first floor runs one principal architectural order, in which Ionic pilasters are the chief detail; and on the second floor there is a similar order for the central building, as well as a corresponding order for each of the wings. In the wings there are stone dormer windows for the attics, and each of the three roof-pieces are carved. The buildings as a whole have ground floor, first floor, second floor, and attics. In the Memorial Building, which is the most ornate and spacious in both its external and its internal scheme, the ground floor is given over to a large room intended for the library, and a writing-room. The library, which is situated in the rear, is 40 ft. square, decorated with Ionic pilasters and with Classic cornice. There is an ornamental gallery for working a lantern, &c. Looking out on the Library square is the writing-room, also a spacious apartment, measuring 40 ft. by 24 ft. In conjunction with this floor, as also with each of the other floors, there is a committee-room. On the first floor there is a large reading-room in front and a committee-room behind. On the second floor there are again two large rooms corresponding in size and position with those on the lower floors. These rooms are not appropriated to any definite uses at present, but the idea is apparently to set them apart as clubrooms for the Historical, Theological, Philosophical, or other College Societies. In the attic there are two rooms also, the larger of which is intended to be used as a billiard-room. It is not quite finished at present. The front of the graduates' building stands forth more prominently than that of the wings, and it is also endowed with a greater wealth of architectural detail. The wings devoted to students' chambers afford accommodation for forty students, and comprise in all eighty rooms, a bedroom and sitting-room being set apart for each student. In each wing an oak staircase gives access to the rooms on the upper floors and attic. Each room has a fireplace, and off the passages to the bedrooms there are coal stores. A lavatory is also provided on each floor. In the basement there is a furnace-room and a cloakroom, and in connexion with the former, Grundy's system of heating by hot air is installed. The first window off the stairs is a memorial in stained-glass to the late Mr. Marshal Porter, a distinguished and gallant graduate of the University, who lost his life in the South African war. This work was executed by Messrs. Heaton, Butler, & Bayne. The contractors were Messrs. Sharpe & Emery, Great Brunswick-street, Dublin. The contract was 21,000*l.*, but there were extra works which brought the amount to a larger figure. Sir Thomas Drew, of Dublin, was the architect.

METHODIST CHURCH, HEREFORD.—The foundation-stones of this church, situated in Chandos-street, were laid on the 29th ult. Externally the church will be built with pressed bricks, with Grinshill stone dressings. In the front there will be a window of muffle-tinted glass. The principal entrance will have columns of red Alverley stone, with carved Portland stone bases and caps flanking the sides. Internally, the furniture will be of pitch-pine. There will be three rows of seats with two aisles, and wood-block flooring will be laid down. In the designs prepared, a school-house has been provided for. The builder is Mr. W. Powell, of Hereford, and Mr. W. W. Robinson, of the same city, is the architect.

HOSPITAL, WATH, SWINTON.—The new hospital of the Wath, Swinton, Greasbro', and North Rotherham Joint Hospital Board, at Wath Wood, is now ready for the reception of patients. The accommodation is for twenty-four beds, with all necessary offices, and a steam laundry. Mr. Campsall, of Sheffield, is the architect, and Mr. Smith, of Mexborough, has executed the building work; Messrs. Roberts, of Sheffield, and Messrs. Asher & Son, Wath, the furnishing; Messrs. Summerscales the steam laundry; Messrs. Trusswell the heating apparatus; and Messrs. Snowden the plumbers' work.

WESLEYAN CHURCH, IPSWICH.—The memorial-stones of this church, which is situated in Bramford-road, were laid on the 28th ult. It is to be built in red brick, with Gunton white dressings. The roof will be of plain tiles, and the principal entrance from the main thoroughfare in the Bramford-road. The plan provides side entrances with a view of enabling stairways to be constructed leading to a gallery. The chapel will be 50 ft. long by 38 ft. wide, and will seat about 400 persons. There will be a school-room at the rear 44 ft. long by 25 ft. wide, and this will afford accommodation for 350. Four class-rooms, with infant school and vestry, are contemplated, the central class-room, dividing two of the rooms, can be added to the chapel at any future time, the two rooms on the other side being appropriated for the purposes of the choir, and the other two rooms utilised as vestries. The benches of the chapel will be of pitch-pine. The estimated cost is 3,600*l.*, including the site. The builder is Mr. Charles Roper, and the architects Messrs. Eade & Johns, of Ipswich..

NEW CHURCH, LEIGH, LANCS.—The foundation-stone of the St. Thomas's Church, Leigh, was laid on the 31st ult. The building, which is to be in the Early Perpendicular style, will cost 12,000*l.* It will have a chancel of three bays and a tower 20 ft. square, the height of which from the ground to the top of the parapet will be 75 ft., or 100 ft. to the top of the cross surmounting the small spire. The church has been designed by Mr. R. B. Preston, architect, of Manchester.

WESLEYAN CHURCH, BEESTON, NOTTS.—The new Wesleyan church, Chilwell-road, Beeston, was opened on the 29th ult. The church is designed in the Decorated Gothic style. It will accommodate about 850 people, and the range of buildings includes extensive Sunday schools. The structure is of pressed brick, with stone dressings, and the spire rises to a height of 130 ft. The church roof is waggon-headed and of pitch-pine, which has been used also for the whole of the interior woodwork. The windows are glazed with stained glass, and the lobby has a mosaic floor. The rostrum is of polished walnut, and has velvet panels with floral designs hand-worked thereon in gold thread by some of the ladies connected with the church. The schoolroom is spacious, light, and lofty, with open roof and stained-glass end windows. There are seven classrooms grouped around the school, also a men's classroom, and a spacious ladies' parlour and kitchen. There are separate vestries for the ministers, stewards, and choir, together with the customary out-offices. The architects are Messrs. W. J. Morley & Son, of Bradford. The building contractors were Messrs. H. Vickers & Son, Nottingham, brick and stone and slaters' work, and the following were the sub-contractors:—G. Thompson, Leeds, plumbing; B. Sugden & Son, Bradford, plastering; and Varley & Son, painting. The stained glass is by Lazenby & Co., of Bradford, and the heating by Danks & Co., Nottingham. The total cost of the buildings, exclusive of furniture, is about 6,700*l.*

WESLEYAN CHURCH, ROWLANDS GILL, NEWCASTLE.—This Wesleyan church was formally opened on the 31st ult. The building was commenced in the spring of 1901, and has been built by Messrs. Turner Brothers, of Gateshead, under the direction of Mr. F. R. N. Haswell, architect, North Shields. It is constructed of stone walls, faced with Tow Law blockers, and the interior measures about 60 ft. by 32 ft., the three classrooms averaging about 16 ft. by 14 ft. The pulpit platform has a centre seat placed under a carved wood canopy. At the opposite end of the church are the two main entrances, leading from Strathmore-road. The gable towards Strathmore-road is at present the most ornamental part of the structure, and the windows are filled with stained glass. The side windows are also filled with leaded lights, provided by Messrs. Thompson & Snee, of Gateshead. The heating is by hot water, carried out by Messrs. H. Walker & Co., Newcastle. As the building has in the meantime to be adapted to school purposes, the seating is partly made with movable backs, which has been supplied by the North of England School Furnishing Co., Newcastle. The chairs, linoleum, and other upholstery were supplied partly by Messrs. Snowball, of Gateshead, and partly by Messrs. Bainbridge, of Newcastle. The total estimated cost of the building is 2,640*l.*

SANITARY AND ENGINEERING NEWS.

AN OFFICIALLY APPROVED ELECTRICITY METER.—The Board of Trade have made an order in approval of the pattern and construction of a meter, No. 9,910, made by Chamberlain & Hookham, Ltd., of Birmingham, and known as the "Hookham" meter, for electricity supplied on the constant potential continuous current system. They also approve of meters after that kind being fixed by screws to a horizontal support, and being connected thus: one service line to be cut and the ends bared of insulation at the cut for about 1 in., the insulation being cut straight across; the outside of the insulating material is to closely fit the hole through which the line passes to the terminal; the connexion to be so made that the current goes through the meter from the + terminal to the − terminal; and the ends of the conductors, which must be tightly clamped in their terminals, are not to project beyond the tops of the terminal boxes

ELECTRIC LIGHTING IN THE CITY.—A report made by Mr. Clifton and Mr. Patchell, architect and engineer-in-chief respectively to the Charing Cross and Strand Electricity Supply Corporation, comprises estimates of 60,000*l.* for the completion of the generating station at Bow and for distributing stations at Fenchurch-street, Ludgate-hill, and Upper Thames-street, 108,000*l.* for completing the trunk and other mains and service connexions in the City, and 113,000*l.* for machinery, &c. The company have already expended 645,060*l.* upon sites, buildings, machinery, mains, &c. They have supplied, or have contracted to supply, 220,000 eight-candle power lamps in the City, and their present instalment at Bow is adequate for 225,000 lamps. They calculate that an additional outlay of 300,000*l.* will enable them to increase the capacity of supply to 375,000 lamps. The figures we quote relate to the "City undertaking" of the Corporation. During eight years past they have served the western portions of the town from their generating station at Lambeth.

WATER SUPPLY, BARROW.—Colonel Strongitharm, who is an alderman of the Barrow Town Council, has been selected to carry out the scheme for bringing water from the Duddon to Barrow. He will resign his seat on the Council.

WATERWORKS, OTLEY, YORKS.—The first sod of the new reservoir at Otley Waterworks was recently cut. The work already done in connexion with this water supply scheme includes the beginnings of an embankment 240 yards in length, which will keep back the moorland streams until a reservoir has been formed providing a storage of 100 million gallons of water—the equivalent of 260 days' supply. Over the embankment a road will be carried, having a bridge across the by-wash with a span of 30 ft. and a width of 17 ft., and at one end a caretaker's house is to be built. Filters also are to be constructed to remove the acidity of the peat and prevent corrosion of the pipes, and there will be an arrangement whereby 150 000 gallons of "compensation water" may be daily turned on for the use of millowners. The supply will be on the gravitation principle. Seven miles of 10-in. pipe line will carry the water down, and the cost of that part of the work is estimated at 3,000*l.* The cost of the whole waterworks scheme is estimated at 80,000*l.* Mr. John Waugh, C.E., is the engineer and Mr. W. S. Arnold the contractor.

FOREIGN.

AUSTRALASIA.—The Forest Department of New South Wales is now paying considerable attention to the forestry of the country, it being recognised that the forests may be turned to better advantage than hitherto. One practice, widely condemned, which is to receive immediate attention, is the

felling of innumerable splendid trees on Crown lands simply as a speculation, and these trees have then been left to rot on the ground. The supply of good timber is said to have been allowed to run down without making provision for conservation or replanting.——The Citizens' Life Insurance Co. are about to erect new offices in Wellington, New Zealand, at a cost of about 30,000*l.* Mr. J. Charlesworth, of Wellington, is the architect.——New convent buildings, erected at Abbotsford, Victoria, have recently been opened. They are in the Early English Gothic style, contain more than 200 rooms, and cost nearly 29,000*l.*——A new Roman Catholic church erected in Kensington, Victoria, has now been completed. Its estimated cost is 2,000*l.*——The Inter-State Convention of master plumbers and sanitary engineers was opened in the Town Hall, Adelaide, early in April last. The business dealt with chiefly had reference to the best means of preserving the public health, from a plumbing point of view.——At the first general meeting of the Institute of Architects of New South Wales, held on April 3 last, Mr. G. Allen Mansfield, F.R.I.B.A., was elected president; Mr. Cyril Blacket, vice-president; Mr. G. Sydney Jones, A.R.I.B.A., hon. secretary; and Mr. A. F. Pritchard, hon. treasurer. The new president has been connected with the Institute for thirty years. The retiring president, Mr. John Barlow, F.R.I.B.A., who has occupied the chair for the past four years, referred to the recent progress made by the New South Wales Institute.

UNITED STATES.—Columbia University is separating its schools of architecture and music from the departments to which they have hitherto been attached, and combining them into a new department of fine arts, to which will be added, later, if the proposed scheme is carried out, schools of painting and sculpture.——The Massachusetts Institute of Technology has acquired a tract of about twelve acres of land in Brookline, in order to erect buildings thereon for the accommodation of some of its departments, the present buildings having proved inadequate.——It has been decided to postpone the Louisiana Purchase Exposition until 1904, it having been found impracticable to have the exhibits ready by next May—the month in which it was originally proposed to be opened.

INDIA.—The North-Western Railway is building a large gas factory at the Karachi end of their line. At the same place the company is erecting an institute for the use of their employés, which was expected to be opened late in the present month. ——The Government of India has sanctioned the remodelling of Parbatipur Junction station, on the Eastern Bengal State Railway, with a view to improving the train service and effecting an appreciable economy in time in travelling.——The committee charged to consider the nature of a memorial to Queen Victoria at Allahabad have decided to erect a clock tower, the base of which is to form a canopy over a bronze statue of her late Majesty. Architects and others are invited to send in designs, and a premium of 2,000 rupees is offered, the competition to close on November 1 next.

AUSTRIA.—The Committee of the Deutschmeister Monument have invited designs for that work from Vienna sculptors, and there is every evidence that there will be a spirited competition. The authors of the first three premiated designs will receive 6,000, 4,000, and 2,000 kronen respectively, and the competition closes on January 20 next.——The authorities of the Buildings Department of Vienna contemplate erecting public offices near the centre of the city, and have issued instructions to city architects in connexion therewith.——Very little progress seems to have been made in reference to the improvement scheme whereby wide boulevards were to be constituted near the cathedral in Vienna. The general arrangement appears to be somewhat analogous to our Strand-Holborn new street and improvement scheme.

MISCELLANEOUS.

LAND BUYING.—Land buyers should consider the *relative* advantages of land offered to them. Land at a low price, far from a town and station, and of very ordinary qualifications, is not necessarily cheap land; but land convenient to a town and station and in a position towards which the town is extending, and with good residential qualifications, is cheaper at a far higher price than the other. The former remains what it is, the latter is not only much more valuable now as possessing qualities for development, but taking into consideration its constantly increasing "unearned increment," is ever advancing in value. By buying land near prosperous and growing towns the fortunes of many families throughout the country have been founded.—*The Land Roll.*

THE ORDNANCE SURVEY (GREAT BRITAIN).—The Ordnance Survey Office have begun the issue of a new series of maps for Great Britain, prepared under the directorship of Colonel D. A. Johnston, R.E. The maps are based upon a revision, commenced four years ago, of the outline maps of England and Wales on the scale of four miles to the inch, and have been extended to include Scotland. The new maps are printed in five colours—burnt sienna for main roads, green for large woods, light brown for hills, and blue for water; they also, for the first time, indicate hilly and mountainous country with stipple shading by photo-etching, the scale being too small for the customary use of contours in that respect. England and Wales will be covered by a complete set of twenty-five sheets, at a price of 1s. 6d. per sheet (unmounted); the seventeen sheets for Scotland will be sold for 1s. each; combined sheets, folded in a cover, will soon be ready for sale.

THE CORPORATION OF LONDON AND THE GRAIN DUTIES.—The Corporation have notified that the ancient rights of metage will cease to be exercised in the City after the end of the present year, concurrently with the expiration of the grain duty. The Metage on Grain (Port of London) Act of 1872, abolished compulsory metage on grain, in lieu of a commutation for a fixed duty during a period of thirty years which is now coming to a close. In return for the revenue derived from that source, which has yielded a gross income of about 19,000*l.* per annum, the Corporation undertook to manage and maintain many open spaces, amongst them being Wanstead Park, Epping Forest, West Ham Park, and Coulsdon Common. A charter, *temp.* Edward III., guaranteed the metage rights of the City, and the Lord Mayor, as clerk of the markets, regulated all weights and measures used in the markets of London. It is recorded that Edward IV. conferred the office of chief gauger on the Lord Mayor by way of paying a heavy debt due to the City.

CITY OF LONDON LYING-IN HOSPITAL.—We learn that the fabric of this hospital has been authoritatively pronounced to be in an unsafe condition. The hospital, which stands at the corner of the City-road and Old-street, was built in 1771-3, after plans and designs by Robert Mylne. The charity was originally founded in 1750, at Shaftesbury, otherwise known as Thanet, House, in Aldersgate-street, which had been built after designs by Inigo Jones, and was pulled down about twenty years ago.

CORONATION ARCH, WHITEHALL. — Messrs. Walker and Ramsay, of Glasgow, have been appointed architects of a temporary triumphal arch which the Canadian Government propose to erect at Whitehall. The arch is to be symbolical of the cereal products of that Colony, and will embody a scheme for its illumination at night.

BUILDING ACTIVITY IN BARNSTAPLE.—Considerable interest was taken in a recent auction sale at Barnstaple, when the large open space of ground at the rear of Boutport-street, known as the Rackfield estate, about 5½ acres in extent, was purchased by Mr. C. H. Symons, of Barnstaple. Plans have now been approved by the Town Council, and building will shortly be commenced. It is proposed to erect 160 houses of the superior artisan type, with lines of frontage varying from 15 to 18 ft. in width, and a depth of from 50 to 100 ft. There will be two main streets, Coronation-street, reaching from Boutport-street to the end of Higher Maudlin-street, a distance of over 600 ft., and King Edward-street (crossing Coronation-street almost at right angles) from Vicarage-street down to the Mill Leet behind the Yeo Vale estate. A shorter street following very much the same lines, only nearer Derby, will be called Charles-street, being linked to King Edward-street by a short street. George-street further connects the two main thoroughfares.

WORKMEN'S DWELLINGS, NEWCASTLE.—At a meeting of the Newcastle Town Improvement Committee, held on the 28th ult., the plans for workmen's dwellings, which the Newcastle Corporation propose to erect in Walker-road and Quality-row, were passed, the differences with the Local Government Board on the subject of room accommodation having been adjusted. The buildings, we understand, will contain about 140 separate dwellings of varying extent in accommodation. Tenders for their erection will shortly be invited. These dwellings are to be built to provide homes for working people displaced by street and other improvements in the city. When they have been completed, it is probable that the proposed extension of Market-street, by cutting a thoroughfare, 60 ft. wide, through the area behind the east side of Pilgrim-street right away to New Bridge-street, will at once come up as a practical measure before the Council.—*Newcastle Leader.*

PLUMBERS' REGISTRATION BILL.—At a meeting of the executive committee of the National Association for the Promotion of Technical and Secondary Education, on May 30, the following resolution was unanimously adopted:—"That the Plumbers' Registration Bill now before the House of Commons would be injurious to the best interests of education; and, having regard to the resolution against any Bill whatever passed at a representative conference of educational and industrial bodies, held three years ago under the auspices of the National Association, the executive committee considers that nothing has occurred to render desirable another decision of the subject, and therefore expresses the hope that the present Bill will not be allowed to pass."

THE SLATE TRADE.—The mineral statistics just issued show a falling-off in 1901 of 85,000 tons of slate from open quarries. The greater portion of this is accounted for by the partial stoppage of the Penrhyn Quarries. There is also a falling-off of nearly 12,000 tons from slate mines; these comprise the leading Festiniog quarries, and as demand is good, both at home and abroad, merchants should place their orders as early as they can.

PIER IMPROVEMENTS, BLACKPOOL. — Terms having been agreed upon between the Corporation of Blackpool and the North Pier Co. for the setting back of the pier entrance for the purpose of the proposed widening of the promenade, the North Pier Co. have decided to carry out certain improvements in the way of a more imposing entrance, as well as another pavilion at the shore end of the pier. The scheme is estimated to cost 20,000*l.*

MARBLE QUARRIES IN THE CYCLADES.—In his annual report, just received at the Foreign Office, Mr. Cottrell, British Consul for the Cyclades, mentions that in the year 1897 a British company, under the name of Marmor, Ltd., was started in Greece, with head offices in London, for the acquisition and working of the marble quarries of Greece. This company has carried on business in various parts of the Cyclades. In the island of Skyros they obtained, under a contract with the municipality of the island, the exclusive right to extract marbles for a period of fifty years. The work commenced in 1899, and until the end of 1901 the extraction amounted to 1,351 cubic metres. This marble was extracted from the old Roman quarries with which the island is honeycombed. The marble consists of white, white and red, white and yellow, white and purple, &c., and also marble with many colours in one piece. Like most coloured marble, however, this marble is very brittle, and it is exceedingly difficult to get large blocks. The grain is very fine, and the colours very delicate, but owing to its brittleness and the time incurred in extraction, the expense is very great. The company have put down installations, have built a mole, and made a road seven kiloms. long, and generally employ about 300 men. The same company are extracting marble in Tinos, almost entirely dark green and black veined. These quarries were originally opened up by a man named Seigel, a sculptor from Munich, who reopened these quarries under the belief that they were the long lost *verde antico.* The columns for St. Paul's, outside the walls at Rome, and the Roman Catholic Church, St. Dionysius, Athens, were extracted from these quarries by him under the belief that it was the genuine *verde antico.* On the death of Seigel the quarries were bought by a Mr. Kloebe, at that time German Consul in Syra, and carried on by him until his death. During the lifetime of Seigel and Kloebe a certain demand was created for these marbles, and when at Kloebe's death the quarries were closed, the demand was filled by a second substitute, namely, *verdes des Alpes,* extracted from quarries close to Genoa. This marble, although not being the real *verde antico,* which has recently been discovered near Thessaly, is still a beautiful marble, and, as the quarries are near the sea, transport is easy, and the marble can be supplied at a low price. The quarries began to be worked in 1900, and up to the end of 1901 205 cubic metres were extracted. The company, having installed wire saws on the latest principles, are able to extract blocks and columns of almost any size. The same British company have quarries in the islands of Naxos and Paros, which, however, they have not yet commenced to work. The Greek Company of Marbles of Paros have laid down installations in the island of Paros for extracting and sawing marble, but they have not been very successful. This company also owns quarries in Naxos, Antiparos, and Amorgos, and are now negotiating with the British company to sell the whole of their plant.

CAPITAL AND LABOUR.

BRICK AND STONE LAYERS' SOCIETY, DUBLIN.—The following resolution has been adopted at a special meeting of the Incorporated Brick and Stone Layers of Dublin:—"That we pledge ourselves to support the Amalgamated Society of Engineers in their fight for an increase in wages, and we believe the manner in which the men have conducted the strike proves the justification of their demand, which is only in accordance with the rapid increase of house-rent in this and other large cities; and, in support of this resolution, our treasurer be instructed to forward a cheque to the treasurer of the Strike Committee of the Amalgamated Engineers; and that copies of this resolution be sent to the Press and the Amalgamated Society of Engineers."—*Freeman's Journal.*

LEGAL.

IMPORTANT BUILDING CASE.

IN the Court of Appeal, composed of the Master of the Rolls and Lords Justices Mathew and Cozens-Hardy, on the 27th and 28th May, the cases of Belcher *v.* the Roedean School Site and Buildings, Ltd., and *in re* an arbitration between the Roedean School Site and Buildings, Ltd., and Belcher and others, came on for hearing on appeals by the company from two orders of Mr. Justice Bucknill in Chambers, dated May 12 last.

Mr. Ralph Neville, K.C., and Mr. O'Leigh Clare, appeared in support of the appeals; and Mr. Reginald Bray, K.C., and Mr. Hudson, for the respondents.

Mr. Neville, in opening the case, said that the two orders appealed against were closely connected, and had better be taken together. The questions which he had to ask their lordships to determine were, broadly speaking, first, whether the Roedean Co.

were entitled to enforce a certain award made under a building contract; and, secondly, in the other case, whether the plaintiff Belcher was entitled to proceed with an action in respect of matters which had been dealt with by the arbitrator, and which were the subject of the award in question.

The Master of the Rolls: The question is whether the award is a good one or not?

Mr. Neville said he thought that was the only point, but there might be other views expressed on the other side. The facts would involve a short historical retrospect. The arbitration clause was contained in a contract dated February 25, 1897, made between the company and Messrs. Peters, Peter, & Son, and it was a contract entered into for the erection of the Roedean School at Brighton. The amount of the contract was something between 43,000*l.* and 44,000*l.*, and Clause 26 was the arbitration clause, which was the important one, and which provided that in the event of any disputes arising between the company and the builders they should be referred to the architect, whose decision should be binding and conclusive on both parties. The architect was a Mr. J. W. Simpson. The date for the completion of the buildings was September 1, 1898. There was a power to determine the contract and to take the work out of the builders' hands and complete it under Clause 20 of the contract. One of the provisions which permitted the taking the work out of the builders' hands under that clause was in the case of an assignment of or charge on the contract moneys without the consent of the building owners. On October 28, 1898, and November 14, 1898, two charges were given on the contract moneys, the first to the Capital and Counties Bank, and the later one in favour of Belcher. Those were made with the consent of the building owners. It appeared afterwards that another had been made, of which they knew nothing. The works were not satisfactorily proceeded with, and were not completed, or anything like completed, on September 1, 1898. The builders got into financial difficulties, and ultimately became bankrupt. On February 1, 1899, the day they filed their petition, the building owners gave, or purported to give, notice under Clause 20 determining the contract, took the work out of the builders' hands, and completed it in accordance with the contract. It was suggested by the other side that that notice determining the contract was bad, but that had nothing to do with the determination of the case. On the same day, a receiving order was made against the builders. The building owners took over the works and they were completed under the superintendence of the architect. On June 27, 1901, a final certificate was granted by the architect, or two years and five months after the taking of the work out of the builders' hands. That certificate found that about 350*l.* was due to the trustee in bankruptcy of the builders. On July 1, 1901, the solicitors to the trustee wrote refusing to accept the certificate issued by Mr. Simpson on the ground that the builders had a large claim against the company for improperly determining the contract. That was the first intimation that any point was raised on the power of the building-owners to give the notice of February 1, 1899. The point having been raised, and there being other differences under the contract the building owners requested the architect to undertake the arbitration which he had to do under the contract, and to make his appointment for the purpose of entering upon it. The architect appointed July 23 for the first sitting. The trustee refused to acquiesce in the arbitration or to submit to the jurisdiction of Mr. Simpson as arbitrator. Before the proceedings were advanced any way the arbitrator was served with notice of an injunction granted by the Court restraining him from proceeding with the arbitration, and that injunction was granted upon a summons issued on behalf of Belcher, asking for the revocation of the submission to arbitration. That injunction was granted in Chambers on August 8, 1901. On November 4, 1901, the matter came before their lordships (*vide* the *Builder* of November 9, 1901), and that order revoking the submission was reversed. The ground upon which the Judge had proceeded was on a writ issued on behalf of Belcher, charging the architect with misrepresentation and fraud, reliance being placed upon a case which had been decided that where litigation was pending between one of the parties to the submission and the arbitrator, the Court would not allow the matter to proceed.

The Master of the Rolls said he remembered the case when it was before this court in November last.

Mr. Neville said that his Lordship was a member of the court then as well as Lord Justice Mathew.

The Master of the Rolls: If you do not like an arbitrator start an action against him.

Mr. Neville replied that that was what it came to. Since the decision in this court he need hardly say that Belcher's action against the architect had not been proceeded with further.

Mr. Bray did not agree with this statement.

Mr. Neville then read several letters which had passed between the solicitors of Belcher and the trustee in bankruptcy of the builders and the company to the effect that the arbitrator had no power to adjudicate on the matters in dispute. The arbitrator then proceeded with the arbitration, and on April 9, 1902, published his award, by which he found, after allowing for a sum due from the builders to the Company, a balance due to the builders of 779*l.* 1s. 8d., and that neither the trustee nor Belcher had any claim against the Company. On April 11, 1902, the Company took out a summons for leave to enforce the award, and on April 14, or three days later, Belcher issued a writ against the Company asking for a declaration that two contracts, dated February, 1897, made between the defendant Company and the builders, were wrongfully determined and repudiated by the Company, and by reason thereof the trustee became entitled to treat the contract as rescinded, and to be paid on a *quantum meruit*, and to recover from the Company the value of the plant lying on the site and wrongfully taken possession of by the Company. Thereupon the Company took out a further summons, seeking to stay this action. There were two contracts referred to in the writ. One was in relation to the drainage works at Roedean, carried out by a man named Field, and no arbitration proceedings had been taken under that contract at all. In their summons the Company asked to stay the proceedings with regard to that contract, and so far as that was concerned the order in chambers stayed the action, but left it in operation with regard to the building contract he (counsel) had called their lordships' attention to, and in respect of which the award was made. Mr. Justice Bucknill by the other order declined to give the Company leave to enforce the award. The learned counsel submitted that the award was perfectly right, and that the Company ought to be able to enforce it. If he was right in that submission Belcher had no right to continue his action or to attempt to go behind the findings of the arbitrator.

Mr. Bray, on behalf of the respondent, submitted that the orders of the learned judge should be affirmed. The whole of the builder's difficulties were brought about by reason of the company dishonouring the architect's certificates, on the ground that they had had notice of a charge on the moneys payable thereunder from some people called Cricklewood. That charge, however, was absolutely illegal. He submitted that a great wrong had been done to the builders and their creditors by the action of the company by giving the notice determining the contract, and by the building owners taking possession of the site. If the notice terminating the contract was wrongful, the builder's trustee had a good claim against the company to be paid on *quantum meruit* for work and labour done and materials supplied. If the company had by their own act prevented the builders from concluding the work under the contract, the whole contract had gone, and the builders would have the right to have the whole work measured up from the very beginning, and to be paid for it. The words of the contract were very general, and did not oust the right of the contractors to say that the building owners had repudiated the contract, and that therefore the contract had gone. He would assume that the building owners had the right to terminate the contract on the ground, say, that an execution was levied. But that execution was caused through the building owners not paying the contractors the money due to them under the certificates. Therefore, they could not take advantage of Clause 20, whatever the interpretation of it was, because the very thing which gave the arbitrator jurisdiction under that clause was caused by the building owner's default in payment of the money under the certificates. The learned counsel also contended that the award of the arbitrator was bad, because even if he had jurisdiction, he had exceeded it. The effect of the award was that Mr. Belcher had a decision against him that he was not entitled to anything from the company, and the only possible jurisdiction of the arbitrator was to deal with the rights between the builders and the company, and with nobody else's rights at all. The only other question was whether the action was an abuse of the process of the Court. The Master said it was not, and the learned Judge said it was not. He (counsel) submitted that this Court should not interfere in the circumstances of the case with the discretion exercised by the Master and the Judge.

Mr. Hudson, following on the same side, said that Mr. Belcher had never, in his character of mortgagee, presented any claim against the company, and that therefore the arbitrator had exceeded his jurisdiction in finding that there was nothing due to him.

The Master of the Rolls, in giving judgment, said it seemed obvious that all parties had consented to the arbitrator exercising jurisdiction to deal with the points which had arisen, and neither Belcher nor the trustee could now turn round and say that the arbitrator had no or had exceeded his jurisdiction. He thought, therefore, that the company should have leave to enforce the award, and that Mr. Belcher's action against the company should be stayed.

The Lords Justices concurred, and the appeal was accordingly allowed.

FLEET-STREET ANCIENT LIGHT DISPUTE.

THE case of Henry Pooley & Son, Limited, *v.* John Feemey & Co. came before Mr. Justice Joyce in the Chancery Division on the 3rd inst., on a motion by the plaintiffs for an extension of an interim injunction to restrain defendants from rebuilding No. 89, Fleet-street in such a manner as to interfere with the ancient lights of the plaintiffs at No. 88, Fleet-street. The defendants' building was the *Birmingham Daily Post* London offices, the plaintiffs being the well-known weighing machine manufacturers.

Mr. Younger, K.C., when the case was called on, said that he appeared for the defendants, and as he had not had an opportunity of digesting the affidavits, or even of seeing some of them, he could not deal with the case then. The main cause of complaint was the alleged obstruction of a top window in the plaintiffs' building. If the defendants' building were completed the result would be that the light to that window would be obstructed by 23 deg. This room was used as a lumber-room.

Mr. Hughes, K.C., on behalf of the plaintiffs, did not agree with that statement of the learned counsel.

Mr. Younger said that the defendants held their building under an agreement from the Corporation of London, and under that agreement they were compelled to remove all scaffolding before Coronation day, so that if his lordship were to grant an injunction which would extend over that day without determining the question between the parties it would impose a very great hardship on the defendants. He suggested that both parties should consent to the case being expedited. If his lordship could see his way to take the case, say, on Tuesday next, and to hear the witnesses, it would be a great convenience to the defendants.

Mr. Hughes said that the plaintiffs would be willing and ready to try the case on Tuesday next.

Mr. Younger said that the injunction which was already granted was a very burdensome one on the defendants. It prohibited the defendants building higher than the old building on the site.

Mr. Hughes remarked that if his lordship was prepared to try the case next Tuesday it was not necessary to discuss the exact form of the interim injunction, although he would consent to modify it if thereby his clients could be adequately protected.

His Lordship: I will take the case on Tuesday next.

Mr. Younger: We will admit that the plaintiffs' top light is ancient. So no evidence need be called upon that point.

Mr. Hughes asked if the learned counsel would admit that the other lights of the plaintiffs were ancient.

Mr. Younger said he could not do that. Another action had been brought against defendants by the trustees of St. Brides' Church, Fleet-street, for the alleged obstruction of the light to the porch of the church. The writ was issued last Saturday and notice of motion for an interim injunction in that case had been given for Friday. The plaintiffs' solicitors in that case would be willing that his lordship should try both actions together. It referred to the same building, but it was, of course, a different obstruction

His Lordship: There can be no similarity between the two cases.

Mr. Younger: It is extremely desirable that both questions should be determined before Coronation day if possible. The action was in Mr. Justice Buckley's list.

His Lordship: Well, Mr. Justice Buckley can take it, I have no desire to try the case. The evidence must be entirely different.

Mr. Younger: As to obstruction. Yes.

His Lordship: Well, that is the point.

Mr. Younger: Mr. Justice Buckley requested your lordship to take it.

His Lordship: No, I shall not. It is an entirely different case.

Mr. Younger said that it would be a matter of very great convenience to the defendants if both cases could be dealt with before Coronation day.

His Lordship said he would not hear the second action. The other he would try next Tuesday.

The interim injunction already granted was continued over that day.

DRURY LANE THEATRE AND THE WORKMEN'S COMPENSATION ACT, 1897.

THE case of Burnett *v.* Drury Lane Theatre, Ltd., came before the Court of Appeal, composed of the Master of the Rolls and Lords Justices Mathew and Cozens-Hardy, on the 4th inst., on the appeal of the defendants (the employers) from an award of the County Court Judge of Shoreditch under the Workmen's Compensation Act, 1897.

It appeared that the applicant was a stage carpenter engaged at the theatre, and at the time of the accident was working near the centre of the stage at some scenery which was being erected for the purposes of a new play, a number of his fellow-workmen being engaged in cutting tumblers. The applicant, in the course of his work, stepped on one of the tumblers and fell, injuring his hand with a saw with which he had been working. It appeared that hydraulic machinery was being used for the sole purpose of raising and lowering a part of the stage with or without scenery upon it. The County Court Judge held that the place where the applicant was working was a "factory" within the meaning of the Act, and awarded him compensation under the provisions of the Act. Hence the present

appeal of the defendants (the employers), on whose behalf it was contended that there was no evidence on which the County Court Judge could rightly hold that the place was a factory within the meaning of the Act.

At the conclusion of the arguments of counsel their lordships allowed the appeal, the Master of the Rolls observing that he did not think the hydraulic machinery used in the present instance brought the case within Section 93, Sub-Section 3, of the Factory and Workshop Act, 1878, or within Section 23, Sub-Section 1, of the Factory and Workshop Act, 1895. He accordingly thought there was no evidence on which the learned County Court Judge could hold that Drury Lane Theatre was a factory.

The Lords Justices concurred.

Mr. Arthur Powell, K.C., and Mr. A. Willis appeared as counsel for the appellants; and Mr. Cyril Dodd, K.C., and Mr. E. A. Jelf for the applicant (the workman).

HEAVY DAMAGES AGAINST BUILDERS FOR NEGLIGENCE.

THE case of Apperley *v.* Mark Patrick & Son came before Mr. Justice Phillimore, sitting without a jury, in the King's Bench Division last week, concluding on the 29th ult., an action brought by the plaintiff, the owner of No. 45, Great Marlborough-street, to recover from the defendants, a firm of builders, damages laid at 10,000*l.*

It appeared that the plaintiff, wishing to have his house pulled down and rebuilt, entered into a contract with the defendants for that purpose on January 10, 1900, by which the defendants agreed for a consideration to execute the works intended to be done in pulling down and rebuilding the house and premises in question. The contract provided that the defendants were to be responsible for loss, damage, or defects, and that they would have to make good the same, this provision applying not only to the building, "but also to the premises adjoining and contiguous, and also to the property nd person." Defendants also contracted to pull own, board, and shore up and clear away the whole of the then present buildings, the old party walls being retained, and were to "effectually shore and uphold all adjoining premises on all sides, consequent on the pulling down, and also to shore, as before, the party walls and the public way and other works, and to be responsible for the same and make good all damage, if any, and also to be responsible for all injury and damage, not only to property but to persons, and make good any work disturbed to roofs, flats, skylights, or other works of adjoining buildings consequent upon the works." Defendants performed the works under the contract, and the plaintiff's case was that they did not effectually shore or uphold the adjoining premises, and did not shore up the party-walls, the result of which was that the wall of No. 46, Great Marlborough-street, collapsed and fell down. In consequence of the damage to the adjoining premises, the tenants brought an action against the plaintiff and defendants, and recovered judgment for 4,286*l.* and costs, which sum plaintiff had paid. In addition to this the plaintiff had expended about 2,389*l.* in defending that action. He also, after the party-wall fell down, had to pay the London County Council 48*l.* for shoring up, and also 36*l* for architects' fees. In these circumstances plaintiff claimed from the defendants the damages before-mentioned.

Defendants by their defence denied that they had been guilty of negligence, and alleged that as they had acted under the orders of the plaintiffs' architect in the matter the architect was guilty of negligence in ordering them to do the work in question. Defendants denied that they were liable to pay to the plaintiff the sum of 4,286*l.* he had paid to the tenants of the adjoining property, as they had by agreement with the tenants, at their own cost, made good all loss, damage, and defects to the premises and ways adjoining to the property of the tenants. Whilst denying liability, defendants paid into Court 2,701*l.*, and said that that sum was sufficient to satisfy the plaintiff's claim, except as to the costs. Defendants also counterclaimed against plaintiff for the sum of 200*l.*, the balance they alleged to be due to them.

Mr. Macaskie, K.C., and Mr. A. M. Bremner appeared for the plaintiff; and Mr. R. B. D. Acland for the defendants.

Evidence was given that the wall collapsed owing to the action of the defendants and their workmen, and not by reason of any orders given for, or on behalf of the plaintiff.

Mr. A. E. Gruning, F.R.I.B.A., gave evidence to the effect that, when he saw the party wall it appeared to be a fairly sound wall. Although it was not a first-class wall, it was quite good enough to maintain. The holes that were cut in the wall at the base for bonding should not have been cut till the last moment. He thought the cause of the collapse of the wall was the crushing of the outer skin of the brickwork between the holes, the loss of material inside which ran down the holes. He should not have allowed the holes to have been cut in the way they had been cut. The wall was formed of two skins with bonds here and there. The wall collapsed straight down—telescoped. As it was an old wall, he thought extra shoring should have been put up when the holes for bonding were made.

Evidence of a similar nature was also given by Mr. Augustus E. Hughes and by Mr. Benjamin Tabberer, F.R.I.B.A., F.S.I., District Surveyor of Greenwich.

Mr. Acland, in opening the defence, said that the question for consideration was whether the surveyor made an error of judgment in allowing the party wall to stand or whether there was negligence on the part of the defendants. His submission was that the defendants were only liable to the extent of the breach of contract under their contract. Could it be said that cutting two holes 6 ft. wide in a 32 ft. wall was such negligence as to cast liability upon the builder. He submitted that the defendants had not been guilty of negligence in cutting these holes. The holes were properly cut, and he contended that if an initial error of judgment on the part of plaintiffs' surveyors had not been made the wall would have stood.

His lordship, after perusing the contract, said that if there had been a breach of contract and there was loss to the plaintiff defendants would be liable for that breach.

Mr. C. G. Patrick, one of the defendants, gave evidence as to tendering for the work and his tender being accepted. He acted on the instructions of Mr. Bartleet, plaintiff's architect. When they commenced to pull down the house they found that the farther they stripped the wall the greater the danger. As they got lower there was no improvement in the state of the wall. When they got just below the first floor there was the question of sustaining the chimney stack above, and plaintiff's architect directed him to put in a couple of steel joists and put brickwork upon them. This he did, and added a weight of some five tons to the top of the wall. Plaintiff's architect also protested that the wall could be kept up, in spite of the defendants' assertion that it was dangerous. After the holes had been cut at the base for the purpose of bonding, the wall fell. In his opinion there was nothing wrong in cutting the holes. He was certain that the wall fell owing to the five tons put on the top of the wall to support the chimney stack. The rotten part of the wall crushed. The holes had nothing whatever to do with the fall.

Further evidence was also given in support of the defendants' case by Mr. Willis, an architect and surveyor; Mr. Pattern, a builder; and Mr. A. Charles, an expert in regard to dangerous structures.

The counterclaim was not proceeded with, the plaintiff agreeing to pay to the defendants the sum claimed.

His Lordship, in giving judgment, said that the plaintiff claimed as against the defendants the money he had paid to somebody else in respect of the fall of the wall. The defendant, as contractor, had agreed with the plaintiff as building owner to be responsible for any loss, damage, or defects arising from accident, carelessness, or otherwise; also to make good any loss, not only to works, but to premises and ways adjoining. That being so, it appeared to him that there was no question for him to consider beyond that of the contract. He had no doubt that the defendants were responsible to the plaintiff under the contract, and the only other question he had to consider was the measure of damages. He thought that there was negligence on the part of the defendants and negligence which caused the accident. He did not impute any negligence to the defendants personally. Mr. Patrick had given his evidence in a very satisfactory manner, and had evidently intended to do everything that was right in the matter. Nor did he think that there was gross negligence on the part of anybody, but he was of opinion that there was negligence on the part of the defendants' foreman or bricklayer. He thought that the wall fell because of the holes that were made near its base. No doubt the wall was a bad wall, but his belief was that the final cutting of the holes brought the wall down, and he came to the conclusion that the wall fell because of the holes. There would be judgment for the plaintiff for the sum he had paid in respect of the wall, viz., 4,286*l.* and the costs, and the costs in the present action. There would be judgment for the defendants on the counterclaim for the 200*l.*, with such costs as they were entitled to on that. The 2,701*l.* which defendants had paid into Court would be paid out to the plaintiff in part satisfaction of his claim against defendants.

Judgment accordingly.

RECENT PATENTS:

ABSTRACTS OF PATENTED INVENTIONS.

2,118.—ELECTRICAL DISTRIBUTION: *B. Hopkinson.*—The batteries take up variations in the load, and the load on the generators remains constant in a system having storage batteries in parallel with the generators. A dynamo, which is driven at a substantially constant speed, is connected in series with the battery and has two small dynamos in its field circuit that are driven at a constant speed, one of them being supplied in part with current from generators that may be remote, whilst the other is wound so as to give a substantially constant potential. The windings are so arranged that the battery is charged or discharges accordingly with a diminished or increased load. Cells of the battery may be substituted for one of the small dynamos.

2,136.—A GUARD FOR A WOOD-PLANING MACHINE: *W. Wild and D. Rigby.*—A guard for revolving cutters is formed of a straight bar which is semicircular in cross-section. One end of it is sustained with a bolt having a head and a fly-nut for adjustment lengthwise. The guard is clamped with the bolt on to one arm at the end of a vertical screw that can be lifted or lowered by means of a hand-wheel; the end of a set-screw which fits in a slot in the vertical screw prevents rotation of the latter.

2,165.—MOULDINGS, CORNICES, &C.: *F. Scheck.*—These are fashioned by applying artificial stone, plastic cement, or some such material to skeletons made of wire cloth, pierced sheet metal, &c., and are to be secured in place with wire loops and hooks.

2,172.—A HOLDER FOR PAINTERS' BRUSHES: *W. Hartley.*—To a tang or socket at the end of a long handle is pivoted a plate on to which the brush-handle is fastened with clamps or tapered sockets. The clamping together of the plate and tang with a bolt and a wing-nut permits the holding of the brush at any angle required. Above the tapered sockets is arranged another clamp or socket for holding a scraper, putty-knife, or hose-pipe, and so on.

2,178.—A SHED FOR DRYING BRICKS.—*D. Sharp & E. Eatwell.*—A shed for the preliminary drying-process is constracted with crossed and open-ended flues from underneath it to perforated air-tubes, above which are steam-pipes that heat the current of air as it enters through the opened-work floor into the drying chamber. Steam pipes may be put inside the air-tubes, or the latter may be fitted with steam-jackets.

2,192.—A CONTRIVANCE FOR USE WITH GAS-METERS: *R. T. Glover.*—To the casing of a dry meter is affixed another casing, which encloses the registering mechanism. To the spindle of the meter mechanism is removably attached the arbor of the first wheel of the train, so that one need not open the meter for a removal of the registering mechanism at any time. The door of the register-casing is locked with a hasp, to be sealed in an outer case.

2,207.—AN APPLIANCE FOR MALT AND SIMILAR KILNS: *H. S. Taylor.*—The inventor devises passages for supplying auxiliary currents of heated fresh air that will mingle with the hot air and products of combustion flowing into the drying chambers, thereby economising both fuel and time. In the walls of a shaft that conveys gases from the furnace, and in those of the furnace he constructs channels, fitted with doors at the inlets, for currents of fresh air, which will thus become heated as they flow to the drying chamber.

2,219.—WINDOW HINGES: *T. McAllan.*—In order that sliding sashes may be turned inwards are provided hinges that can be separated, and one or both of the hinges are double-jointed. The opening of the window is facilitated by making the stop and parting beads as removable parts.

2,230.—MEANS FOR DISINFECTING CLOSETS: *C. Schinzer.*—Two pipes are set in communication between the flushing cistern and a retainer above it for the disinfectant. The lower end of one pipe will be uncovered whenever the cistern is emptied, and the disinfectant is then impelled through the other pipe by the air that flows into the retainer.

2,252.—SEATINGS FOR VALVES: *J. Hopkinson, J. Hopkinson & Co., and J. Lowis.*—A movable seating-ring, fastened with a retaining ring, is provided for sliding, safety, lift, and other kinds of valves. The retaining ring reposes upon a shoulder fashioned on the outside of the seating-ring, and a fixed ring or studs keep the retaining-ring in its place. In another form that ring is provided with wedge-shaped lugs which constitute a bayonet-joint with lugs upon the casing.

2,264. — MANUFACTURE OF LAVATORY AND SIMILAR BASINS: *S. H. Rowley, M. J. Adams, and T. Till.*—For rolling the plastic material over a rounded form or core, or within a hollow mould, the latter is placed between the carriers of a roller-mounted endless chain, whilst another endless chain causes the moulding roller to travel at the same speed as that of the mould, the shape of the roller is at first produced by running the mould beneath the soft roller, of which latter a plaster cast is then taken—the cast serving as a mould for the plaster pressing-roller. The roller may consist of two parts, or of only one, in the latter instance it is secured to the axle with forked metallic cramps having screwed shanks. By another adaptation a segmental metallic roller shell which is bolted on to flanged and radial frames upon the axle carries the die that presses the plaster. Confer also No. 11,865 of 1899.

2,276.—A LOCK FOR DOUBLE GATES AND DOORS: *C. E. Long.*—A sliding bolt, when shot, may be locked by means of an auxiliary lock upon the bolt, having a bolt in engagement with a shoulder in the bolt frame, door, or gate; a handle or a spring shoots the sliding bolt, or the operator may insert his finger through a slot in the casing into a hole cut in the bolt. The keyhole of the auxiliary lock may be either set so as to register with a keyhole in the casing when the sliding-bolt has been shot, or become uncovered when the lock is opposite the slot in the casing.

2,279.—CONSTRUCTION OF SAFES WITH ELECTRICAL ALARMS: *P. Beau.*—A fireproof material compounded of Portland cement and lava, or some such fireproof sand, is laid in panels around the metallic skeletons which constitute the walls of the safe. An insulating sheet of asbestos is laid between the inner and outer skeletons, which are also joined together with asbestos-covered channel irons. The panels are formed by pressing layers of the compound with iron frames; they are then hardened by the application of double fluo-silicate of soda or potash. Electrical connexion between the walls and the metal of the door is effected through the contact with the corresponding skeleton of the door, which is set up by the connexion of a Z-shaped iron in the door-frame to the outer skeleton of the safe, whilst a spring upon the other skeleton establishes—at the shutting of the door—contact with a spring which is coupled to the other skeleton of the door. An alarm is founded when contact arises between the skeletons of the safe and door, which are coupled up to a battery, the alarm-bell being arranged in the circuit.

2,309.—A CONTRIVANCE FOR USE WITH WOOD-PLANING MACHINES: *F. Sagar and D. Sagar.*—For stripping or planing the wooden board at any angle desired a plate is attached to the side of the machine-table with bolts inserted through slots cut diagonal-wise; a screw will lift or lower the plate as it is moved length-wise in relation to the table, and when the plate is lifted it holds up the board at an angle.

2,365.—CLOSET AND OTHER BASINS, AND THEIR MOULDING: *M. F. Adams and S. H. Rowley.*—The inventors contrive that the flushing-rim of the basin of a urinal, closet, and so on shall be moulded in one piece with the basin by means of a projection which is made upon the mould; the opening, which may be left upon the inside of the rim, is closed with a strip of clay.

2,409.—MANUFACTURE OF PORTLAND CEMENT: *H. E. Riisager.*—The natural and undried materials are in the first place partly reduced and then pulverised together in tube mills with water just enough for yielding a thick sludge, which is dried or burned into clinker in rotatory kilns. The clinker, when ground, will constitute the cement.

2,412.—A FLANGE JOINT FOR SOIL-PIPES, WATER-CLOSET PAN SOCKETS, &c.: *F. W. Sutton.*—A joint, which is claimed as being available for metallic pipes, and flush or ventilating nozzles or soil-pipes, and for the socket of a water-closet pan comprises two half-rings, gutter-shaped, and hinged at one end, their other ends being held together so that an entire ring is formed. The half-rings are filled with red lead and put around flanges of the pipe. A lipped hole upon one half-ring will engage with a hook upon the end of the other half-ring.

2,461.—CONDUITS FOR ELECTRICAL CONDUCTORS: *E. D. Page.*—For the conductors of wiring-plant for ceilings and walls are devised conduits or casings that consist of single or multiple metallic troughs which are severally divided by their raised middle portions through which the fastening screws are inserted. The sides of the trough are flanged for holding a lid of some flexible metal, and the flanges also are flexible in order to permit the lifting of any part of the lid.

2,463.—STAIR NOSINGS: *C. E. Knapp.*—A canvas lining is applied to a curved moulding of india-rubber for the nosings of stairs, and is nailed or tacked on to the tread and riser, recesses in the nosing take the edges of the stair covering.

2,481.—PROCESS OF MOULDING BRICKS: *C. Riedel and H. Schiegner.*—The die or mouthpiece of an extruding machine is lubricated with water conveyed through a cock at the inlet and an inclined or spiral winding grove formed in the die to a cock at the outlet. The contrivance is available for the moulding of bricks of stone or some similar plastic material.

2,482.—IMPROVEMENTS IN LAVATORY BASINS: *N. E. Cooke.*—The inventor fits on to the outlet of the basin a flanged ferrule and fastens it with a screwed collar, another collar is joined with rods to the flange. The tubular discharge valve and overflow pipe are arranged to slide in the latter collar. In the ferrule is a seating for the lower conical end of the tube, and a pin having an engagement either with a spiral groove or in the form of a bayonet-joint holds up the discharge valve.

2,500.—MATERIALS FOR PORTABLE BUILDINGS: *F. C. Jenkins.*—A framed and hollowed fireproof wall or partition-piece is made up of channel-bars in sheet-metal and plates of asbestos, or other suitable material, that are bolted to one another. Plates or strips are used to cover the interior vertical joints between the distance-pieces. For roofs are employed channelled rafters of sheet-iron and plates fastened with bolts and caps, angle-shaped weather-strips are inserted between the horizontal edges of the exterior wall-plates, and bent strips clamped between cross-binders and cover-strips render the horizontal joints waterproof.

2,510.—FLUSHING APPARATUS: *E. Katzenberger.*—A vertical rod within the bell joins it to a rocking lever. At the end of the pulling-device a spring is placed between the top of the bell and the inside of the cover, and the bell is set so as to work in a well (that may be easily detached), with apertures for the flow of the flush. The lifting of the bell by a pull upon the chain fills the bell, which, however, is pressed downwards by the spring so that the water is impelled over the crown of the siphon, and the flush is started.

2,516.—SCALES FOR PURPOSES OF COMPUTATION: *R. Proell.*—An upper graduated and transparent member and a graduated member consist severally of a logarithmical scale which is divided into lengths arranged the one over the other, whilst the two scales should be read the one from the bottom and the other from the top, though, in another form, the scales are set in the same direction. In line with the ends of the scales and divided from them by a distance which is equal to the depth of the scales are marked points which supplement the beginning and the ending points, respectively, of the two scales. For extraction of a square root one joins the number on the lower member by the edge of the lower member to a point either to the left or to the right, accordingly as a semicircle (which is marked, in alternation, at the right and left hand ends of the scale lines in the lower member) is to the left or right of the scale-line on which is the number, and one must choose the upper or lower point, accordingly as the number has an odd or an even number of digits: for instance, $\sqrt{3} = 1{\cdot}732$ will be indicated at the middle point of the line that joins three to one of the beginning points; $\sqrt{60} = 7{\cdot}75$ will be shown at the middle point of the line that joins sixty to another beginning point. The scales are also adjusted and divided for multiplication, division, and extraction of cube roots.

MEETINGS.

FRIDAY, JUNE 6.

Royal Institution.—Sir Benjamin Baker on "The Nile Reservoir and Dams." 9 p.m.

SATURDAY, JUNE 7.

Northern Architectural Association. — Students' Sketching Club Excursion.

MONDAY, JUNE 9.

Liverpool Architectural Society.—Special meeting: Discussion on the "Revised Charges of Architects.' 6 p.m.

Royal Institute of British Architects.—Business meeting. 8 p.m.

SATURDAY, JUNE 14.

Incorporated Association of Municipal and County Engineers.—Midland District meeting, Wolverhampton. Assemble at Town Hall, 10.45 a.m.

Edinburgh Architectural Association. — Visit to St. Monan's Church, Fife.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

May 15.—By MILES & SON (at King's Lynn).

King's Lynn, Norfolk.—St. John's-ter., The Temperance Hotel, f., as a going concern.... £4,400

May 22.—By PROTHEROE & MORRIS (on the Estate).

Birchington, Kent.—Canterbury-rd., &c., twenty-nine freehold building plots (in lots) 1,305

By T. LAVINGTON (at Devizes).

Devizes, Wilts.—30 to 35, Estcourt-st., f., w.r. 100*l.* 2s. 6d..... 1,000

Potterne, Wilts.—Furze Hill, four enclosures, 24 a. 3 r. 21 p., f. 1,200

May 23.—By PROTHEROE & MORRIS (on the Estate).

Pegwell Bay, Kent.—Main-rd, &c., seventy-two freehold building plots (in lots)..... 756

By W. TEAGLE & SONS (at Chippenham).

Christian Malford, Wilts.—Summerlands and 14 acres, f., p. 1,410

By DUNCAN & KIMPTON.

Wandsworth.—64, Merton-rd., u.t. 79 yrs., g.r. 6*l.*, w.r. 36*l.* 8s. 200

76 and 78, Merton-rd., u.t. 80½ yrs., g.r. 12*l.*, w.r. 72*l.* 16s. 510

By FISHER, STANHOPE, and DRAKE.

West Ham.—3 to 13 (odd), Morton-rd., u.t. 77 yrs., g.r. 30*l.*, w.r. 140*l.* 8s..... 1,005

By GIDDY & GIDDY.

Brentford, Middx.—Marlborough Lodge and ¾ acre, f., p..... 1,860

By E. HOLSWORTH.

Camden Town.—76, St. Paul's-rd., u.t. 48 yrs., g.r. 7*l.*, y.r. 45*l.*..... 410

42, St. Paul's-cres., u.t. 48 yrs., g.r. 5*l.*, y.r. 40*l.*..... 345

By GOODMAN & CROWTHER.

Battersea.—13 to 16, Havelock-ter., u.t. 60 yrs, g.r. 12*l.* 12s., w.r. 104*l.*..... 650

17 and 18, Havelock-ter., u.t. 60 yrs., g.r. nil, w.r. 52*l.*..... 420

33 to 42, Havelock-ter., u.t. 73 yrs., g.r. 45*l.* 10s., w.r. 270*l.* 10s..... 1,635

Camberwell.—45, Lyndhurst-gr. (S), u.t. 74½ yrs., g.r. 9*l.*, y.r. 40*l.*..... 430

64, Southampton-st. (S), and 1, Westmacott-st., u.t. 54½ yrs., g.r. 10*l.*, w.r. 59*l.* 18s..... 350

South Lambeth.—2, 4, 6, and 8, Bolney-st., u.t. 33 yrs., g.r. for 19 yrs. 6*l.* 16s., and thereafter 7*l.* 3s. 360

By F. & W. STOCKER.

Gray's Inn-rd.—1 to 13 (odd), 17 and 19, Ampton-st., u.t. 20¾ yrs., g.r. 45*l.*, y.r. 502*l.* 3,360

2 to 16 (even), Ampton-st., u.t. 20¾ yrs., g.r. 40*l.*, y.r. 440*l.* 2,820

1 to 4, Frederick-pl., u.t. 20¾ yrs., g.r. 20*l.*, y.r. 225*l.* 1,450

5 and 6, Frederick-pl., and 29 and 31, Frederick-st., u.t. 20¾ yrs., g.r. 15*l.*, y.r. 168*l.* 1,170

9 to 27 (odd), Frederick-st., u.t. 20¾ yrs., g.r. 50*l.*, y.r. 546*l.* 3,730

Balham.—2, 4, 6, and 8, Elmfield-rd., f., y.r. 167*l.* 2,540

By G. A. WILKINSON & SON.

Shepherd's Bush.—Uxbridge-rd., &c., i.g. rents 100*l.* 4s, u.t. 7½ yrs., g.r. 32*l.* 15s., with reversion £1,025

Uxbridge-rd., The Wellington p.-h., i.g.r. 10*l.*, u.t. 7½ yrs., g.r. 5*l.* 525

City of London.—Red Cross-st., The Three Tuns p.-h., &c., f.g.r. 100*l.*, reversion in 85 yrs. .. 2,700

Red Cross-st., f.g.r. 63*l.*, reversion in 85 yrs. .. 1,600

Paper-st., f.g.r.'s. 262*l.*, reversion in 85 yrs..... 7,025

Clapton.—Lea Bridge-pl., The Ship Aground p.-h., f.g.r. 65*l.*, reversion in 61½ yrs..... 1,600

Lea Bridge-pl., f.g.r. 80*l.*, reversion in 61½ yrs. 2,160

Oxley-ter., f.g.r. 60*l.*, reversion in 68 yrs. 1,220

Russell-ter., &c., f.g.r. 20*l.*, reversion in 87 yrs. 560

Oak Cottages and British Oak b.-h., f.g.r. 45*l.* reversion in 58 yrs. 1,215

Alexandra-ter., f.g.r.'s. 46*l.*, reversion in 95 yrs. 1,245

Chatsworth-rd., f.g.r. 40*l.*, reversion in 86½ yrs. 1,160

Hackney.—Wick-rd., c.g.r. 104*l.*, reversion in 78 yrs. 2,460

Wick-rd., &c., c.g.r.'s. 135*l.*, reversion in 54 and 53 yrs. 3,265

Clapton.—Upper Clapton-rd., c.g.r. 8*l.* 8s., reversion in 28 yrs..... 200

Clapton.—Lea Bridge-pl., The India Rubber Works, area 12,900 ft., f., y.r. 100*l.* 1 790

Chatsworth-rd., freehold building land, with cottages thereon, area 1 a. 3 r. 35 p., p..... 3,170

Hackney.—Clarence-rd., The Duke of Clarence p.-h., f.., y.r. 90*l.* 2,300

80 to 90 (even), Clarence-rd., f., y.r. 174*l.*..... 2,865

1 to 8, Clarence-pl., f., y.r. 252*l.* 3,700

20, Clapton-sq., f., y.r. 50*l.* 735

39, Elsdale-st., f., y.r. 14*l.* 270

May 24.—By JACKSON & MASTERS (at Lymington).

Wootton, Hants.—The Rising Sun p.-h. and 14 a. 3 r. 27 p., f., & r. 70*l.* 2,300

Milton, Hants.—Two enclosures of land, 13 a. 2 r. 12 p., f. 830

Two enclosures of land, 5 a. 0 r. 30 p., f. 320

By W. DEW & SON (at Carnarvon).

Clynnog, Carnarvon.—The Tyn-y-Coed Estate, 284 a. 1 r., f. (in one lot)..... 6,150

By Fox & VERGETTE (at Huntingdon).

Broughton, Hunts.—White Hall and Mill Barn farms, 373 a. 0 r. 10 p., f, and c. (in one lot) . 4,050

By T. LAVINGTON (at Marlborough).

Fyfield, Wilts.—Ivy Cottage and 1 a. 2 r. 33 p., f. 440

By Messrs. MELLERSH (at Guildford).

Bramley, Surrey.—Part of Bramley Manor Farm, 41 a. 2 r. 7 p., f..... 1,660

May 26.—By GEO. BILLINGS.

Hackney.—17, St. John's Church-rd., u.t. 68 yrs., g.r. 6*l.*, e.r. 38*l.* 360

Homerton.—25 to 35 (odd), Nesbit-st., u.t. 63 yrs., g.r. 30*l.*, w.r. 132*l.* 12s. 580

By BRODIE, TIMBS, & CO.

Hampstead.—107, Finchley-rd., u.t. 43½ yrs., g.r. 15*l.*, p. 910

By H. J. BROMLEY.

Forest Hill.—Forest Hill-rd., Woodville and 1½ a., f., p. 2,250

176 and 178, Forest Hill-rd., f., y.r. 105*l.* 1,425

By ELLIOTT, SON, & BOYTON.

Brondesbury.—23, Cavendish-rd., u.t. 78 yrs., g.r. 15*l.*, p. 1,250

By FLEURET, SONS, & ADAMS.

Eastbourne, Sussex.—Cornfield-ter., The Sussex Hotel, with shop adjoining, f., p., with goodwill 19,100

By HOLLIDAY & STANGER

Streatham, Fairmile-av., Bonnie Cot, Limavady, and Rosslyn, u.t. 95 yrs., g.r. 22*l.* 10s., y.r. 116*l.* 1,245

By WM. HOUGHTON.

Buckhurst Hill.—High-rd., Ormonde House and The Chestnuts, area 10 a. 1 r. 20 p., f., p..... 7,500

Walthamstow.—Hale End-rd., a corner freehold hotel site 485

33, Higham-st., f., y.r. 20*l.* 16s. 300

Battersea.—Strath-ter., i.g.r. 15*l.* 5s., u.t. 62 yrs., g.r. 7*l.* 140

By BROWETT & TAYLOR.

Norwood.—213 and 215, Selhurst-rd., f., y.r. 170*l.*..... 2,490

247 and 249, Selhurst-rd. (s.), f., y.r. 160*l.* 2,860

196, Selhurst-rd., f., y.r. 60*l.*..... 810

216, Selhurst-rd. (s.), y.r. 48*l.* 800

Burgoyne-rd., two blocks of freehold land 1,105

Beckenham, Kent.—16, Linden-grove, f., w.r. 32*l.* 10s. 310

By G. PEARCE & SONS.

Hoxton.—74, 76, and 78, Shepherdess Walk (s.), and 5, Edmund's-pl., u.t. 40 yrs., g.r. 12*l.* 12s. y.r. 196*l.* 12s..... 1,600

Brixton.—17 to 27 (odd), Talmer-rd., u.t. 72 yrs., g.r. 34*l.* 10s., w.r. 192*l.* 10s. 1,965

36 to 42 (even), Barnwell-rd., u.t. 70 yrs., g.r. 26*l.*, y.r. 183*l.* 14s. 1,315

Islington.—3, Devonshire-st., f., e.r. 55*l.* 890

By W. W. READ & CO.

Paddington.—Eastbourne-mews, No. 3, "B Arch," u.t., 36½ yrs., g.r. nil, e.r. 50*l.*..... 200

By THOMAS, PEVER, & MILES.

Eton, Bucks.—High-st., the Christopher Hotel, u.t. 31½ yrs., r. 200*l.*..... 150

By ALFRED RICHARDS (at Tottenham).

Tottenham.—55 and 57, Chestnut-rd., f., w.r. 65*l.* 665

Edmonton.—7 and 9, Chauncy-st., u.t. 72 yrs., g.r. 5*l.*, w.r. 36*l.* 8s. 215

7, Dartmouth-terr., f., w.r. 22*l.* 2s. 280

May 27.—By CHINNOCK, GALSWORTHY, & CO.

Holborn.—59 and 62, Leather-lane (S), f., y.r. 168*l.* 3,050

42 and 44, Hatton-wall (S), f., y.r. 130*l.* 2,800

58g, Hatton-gdn., f., y.r. 100*l.* 2,170

58b, Hatton-gdn. (S), f., y.r. 185*l.* 4,000

58h, Hatton-gdn. (S), f., y.r. 200*l.* 4,800

Gray's Inn-rd.—Nos. 84, 84a, 86, and 86a (S), f., y.r. 297*l.* 10s. 4,800

Nos. 96, 96a, 98, and 98a (S), f., y.r. 301*l.*..... 5,200

Holborn.—Clerkenwell-rd., &c., Griffin Buildings (model dwellings), f., y.r. 325*l.*..... 5,000

By DEBENHAM, TEWSON, & CO.

City of London.—33 and 34, Monkwell-st. (warehouses), area 4,520 ft., u.t. 60½ yrs., g.r. 220*l.*, y.r. 1,100*l.* 9,500

Chingford.—Forest View, freehold corner residence, y.r. 85*l.* 1,400

Ore, Sussex.—Old London-rd., Osborne House and 8 a. 0 r. 36 p., f, p. 3,100

By ROGERS, CHAPMAN, & THOMAS.

Fulham.—15, Maxwell-rd., u.t. 49 yrs., g.r. 6*l.*, y.r. 60*l.* £560
Brompton.—99 and 103, Ifield-rd., u.t. 50 yrs., g.r. 16*l.*, y.r. 144*l.* 600
South Kensington.—7, Westgate-ter., u.t. 50 yrs., g.r. 15*l.*, y.r. 80*l.* 460
26, Hereford-sq., u.t. 41½ yrs., g.r. &c, 23*l.*, y.r. 60*l.* 550

By RUTLEY, SON, & VINE.

Hampstead-rd.—42 and 44, William-st. (S.), u.t. 19 yrs., g.r. 12*l.*, y.r. 98*l.* 505
169, Stanhope-st., u.t. 36 yrs., g.r. 3*l.*, y.r. 55*l.* 570

By JOSEPH STOWER.

Regent's Park.—17, 18, 20, and 21, Eton-st., u.t. 50 yrs., g.r. 32*l.*, y.r. 178*l.* 1,800

By FRANK SWAIN.

Notting Hill.—16 and 18, Victoria-gdns, u.t. 56½ yrs., g.r. 8*l.* 10s., y.r. 88*l.* 1,010

By T. N. TURNER.

St. John's Wood.—1 to 8, Alexandra-mews, u.t. 55 yrs., g.r. 40*l.*, y.r. 280*l.* 4s. 1,800
Marylebone.—37, 39, and 41, Richmond-st., u.t. 35 yrs., g.r. 14s., y.r. 66*l.* 2s. 400
19 and 20, Weston-pl. and stable yard in rear, u.t. 35 yrs., g.r. 14s., y.r. 58*l.* 12s. 400

By WALTON & LEE.

Tenby, Pembroke. — St. Mary's, Waterwynch, and 43a. 1r. 2p., part f. and part u.t. 70 yrs., g.r. 25*l.*, p. 2,500

By FREDERICK WARMAN.

Highbury.—7, Highbury-quadrant, u.t. 47 yrs., g.r. 16*l.* 10s., e.r. 100*l.* 880
118, Highbury-hill, u.t. 75 yrs., g.r. 6*l.* 6s., e.r. 52*l.* 575
Crouch End.—2, 4, 6, and 8, Barrington-rd., u.t. 87 yrs., g.r. 28*l.*, y.r. 160*l.* 1,770
Canonbury.—39, Clephane-rd., u.t. 44 yrs., g.r. 1*l.*, y.r. 36*l.* 350
19, Marquess-rd., u.t. 43 yrs., g.r. 6*l.* 10s., y.r. 45*l.* 455

By A. W. TAYLOR & CO (at Putney).

Wandsworth. — Merton-rd., a block of freehold land, area 79,000 ft. 1,040
31, West Hill-rd., u.t. 48 yrs., g.r. 14*l.*, e.r. 70*l.* 285
Putney.—34 and 36, Charlwood-rd., u.t. 49 yrs., g.r. 10*l.* 10s., y.r. 82*l.* 740
103, Disraeli-rd., u.t. 62½ yrs., g.r. 6*l.*, e.r. 36*l.* 320
4 and 5, Colinette-rd., u.t. 73½ yrs., g.r. 39*l.*, e.r. 220*l.* 1,820

By LANGRIDGE & FREEMAN (at Tonbridge).

Wrotham, Kent.—Stagg's Hole House and 1a. or. 30p., f. 300
Down-st House and 2a. 1r. 11p., f. 920
Plaxtol, Kent.—Broadfield Farm, 43a. 2r. 8p., f. 1,500
Little and Porter's Meads, 2a. 3r. 2p., f. 125
Hadlow, Kent.—The Squirrels (land), 2a. 1r. 13p., f. 120
East Peckham, Kent.—Common Mead, 0a. 2r. 17p., f. 19
Plaxtol, Kent.—Reed House, f., p. 1,115
Hildenborough, Kent.—Fir Tree Lodge and 1¾ acre, f. 830

By HOLLIS & WEBB (at Leeds).

Askwith, Yorks.—Town Head Farm, 63a. 2r. 39p., f. 3 000
A freehold holding, 5a. 1r. 30p. 525
West Beck farm, 72a. 0r. 12p., f. 3,015

By ORGILL, MARKS, & LAWRENCE (at Masons' Hall Tavern).

Dalston.—Lansdowne-rd, the Paget Arms p.-h., also 105, Albert-rd., u.t. 49 yrs., r. 136*l.*, with goodwill 8,600

By EDGINGTON & SONS (at Reading).

Reading, Berks. — Christchurch-rd., Mildmay Cottage, f., p. 685

By PALMER & SEDGWICK (at Axbridge).

Weare, &c., Somerset.—Upper Weare Farm, with various enclosures of land, about 168 acres, f. (in lots) 9,980

May 28.—By S. H. DAVIDS & CO.

Brompton.—7, 8, and 9, Montpelier-row, f., y.r. 112*l.* 1,810

By FLINT & PITT.

St. John's Wood.—30, 32, 34, and 36, Carlton-hill, u.t. 35 yrs., g.r. 42*l.*, y.r. 345*l.* 2,790
Barnes.—Lonsdale-rd., Heathbourne, u.t. 50 yrs., g.r. 10*l.*, e.r. 50*l.* 235

By HUMBERT & FLINT.

Kensington.—4, Addison-cres., f., y.r. 200*l.* 3,000
Bricket Wood, Herts.—The Old Brickfields and Juniper Wood, area 42 a., f., p. 2,500
Fulham.—Filmer-rd., Filmer-chambers (shops and flats), u.t. 87 yrs., g.r. 1*l.*, w.r. 202*l.* 16s. 1,200

By MABBETT & EDGE.

Westgate-on-Sea, Kent.—Canterbury-rd., Doon House (school) and 5a. 1r. 10p., f., y.r. 42*2l.* 7,700

By MANSELL & ROWE.

Ventnor, Isle of Wight.—High-st., f.g.r. 60*l.*, reversion in 980 yrs. 1,520

By MAY & PHILPOT.

Streatham.—56, Killieser-av., u.t. 78 yrs., g.r. 11*l.* 10s., p. 770

By STANLEY PARKES & BROWN.

Hornsey.—37, Raleigh-rd., u.t. 80 yrs., g.r. 6*l.* 10s., e.r. 32*l.* 325
5, Waldegrave-rd., u.t. 77 yrs., g.r. 6*l.*, y.r. 28*l.* 280
Wood Green.—38, 40, 44, 46, 48, and 50, Cobham-rd., u.t. 98½ yrs., g.r. 36*l.*, y.r. 168*l.* 1,530

By E. W. RICHARDSON & SON.

Muswell Hill.—1, Alexandra Pk.-rd., u.t. 93 yrs., g.r. 9*l.* 9s., e.r. 55*l.* 580

By R. TIDEY & SON.

Be Beauvoir Town.—12, 14, and 20, Church-rd., u.t. 11 yrs., g.r. 14*l.* 10s., y.r. 110*l.* 705
Finchley.—21, Leicester-rd., f., y.r. 30*l.* 500
Peckham.—25, Linden-gr., u.t. 46½ yrs., g.r. 7*l.*, p. 430

By DOUGLAS YOUNG & CO.

Notting Hill.—13, High-rd., area 4,480 ft., f., p. 2,625
Dulwich.—36 and 44, Alleyn-rd., u.t. 70 yrs., g.r. 2*l.*, e.r. 160*l.* 2,310
Brixton.—384 and 386, Coldharbour-lane (s.), u.t. 64 yrs., g.r. 10*l.*, y.r. 126*l.* 1,375
1, Belgrave-ter., u.t. 24 yrs., g.r. 9*l.* 10s., e.r. 50*l.* 310
13, Holland-rd., u.t. 12 yrs., g.r. 6*l.* 10s., w.r. 71*l.* 10s. 180
Camberwell.—75, Grosvenor-pk., u.t. 12½ yrs., g.r. 5*l.*, y.r. 36*l.* 170
Clapham.—39 and 39a, Jeffrey's-rd., f., y.r. 130*l.* 770
Streatham.—23 and 25, Ellison-rd., u.t. 53 yrs., g.r. 10*l.*, e.r. 64*l.* £500

May 28.—HUNTER & HUNTER.

Camden Town.—2, Hamilton-st., and 141 and 143, Bayham-st., u.t. 53 yrs., g.r. 6*l.* 6s., y.r. 103*l.* 150
Hampstead.—Rosslyn Hill, f.g.r's. 100*l.* 5s., reversion in 46½ yrs. 2,845
Rosslyn Hill, f.g.r's. 202*l.* 17s. 6d., reversion in 77½ yrs. 5,760
68 and 70, Rosslyn-hill (s.), f., y.r. 180*l.* 3,620
Branch Hill Side, f.g.r. 75*l.*, reversion in 70½ yrs. 2,060
10 to 15, Golden-sq., f., w.r. 114*l.* 1,200
The Gables, f.g.r's. 42*l.*, reversion in 71 yrs. 1,175
Vale Lodge, Vale House, and Vale Cottage, f., y.r. 112*l.* 1,850
Hatchet Bottom (garden ground), u.t. 802 yrs., g.r. 2*l.*, y.r. 4*l.* 175
Vale of Health, 5 freehold cottages, y.r. 141*l.* .. 1,980

By Messrs. SPELMAN (at Yarmouth).

Martham, Norfolk.—The Green, 3 freehold cottages 338
Somerton-rd., 2 enclosures, 13a. or. 26p., f. .. 410
Somerton-rd., 2 freehold cottages 193
Hemsby, Norfolk.—Farmhouse and 20a. 2r. 38p., f. and c. 750
Three pieces of building land, 6a. 1r. 5p., c. .. 200

By HENRY HENDRIKS (at Birmingham)

Edgbaston, Warwick.—Poplar-av., plot of building land, area 11,139 yds., f. 1,300

By HEPPER & SONS (at Skipton)

Snaygill, Yorks.—The Bay Horse Inn and 2a. or. 2p., f., y.r. 40*l.* 1,580
Close of meadow land, 5a. or. 29p., f. 510
Various enclosures of land, 54a. 3r. 0p., f. 2,340
High Bradley, Yorks.—Old Hall and New House Farms, 111a. 1r. 34p., f. 1,610
Addingham, Yorks.—Street House Farm, 47a. 1r. 27p., f. 1,900
New Allotment and Low and High Intakes, 25a. 0r. 21p., f. 750

By SWAN WOODCOCK (at Stratford).

Leytonstone. — 5 to 15 (odd), Argyle-st., f., wr. 140*l.* 8s. 1,200
West Ham —47, Marcus-st., f., e.r. 28*l.* 300

By CUNNAH & ROBERTS (at Hooton).

Neston, Cheshire.—The New Farm, 91½a., f. 6,025
Three freehold enclosures, 11a. 0r. 12p. 775
Upland House and 12a. 2r. 37p., f. 935
A freehold field, 2a. 2r. 17p. 235

May 29.—By Messrs. CRONK.

Sevenoaks, Kent.—Bradbourne-pk.-rd., a building site, 2a. 3r. 3p., f. 980

By E. H. HENRY.

Clapham Common.—2, Cedars-rd., f., p. 1,800
Wandsworth Common.—51, West-side, f., p. 860

By HAMPTON & SONS.

Southend-on-Sea, Essex.—8 to 18, 22 to 28 (even), and 32, London-rd., f., y.r. 635*l.* (in lots) 10,800

By W. MARTIN & CO.

Dulwich.—3, Glengarry-rd., u.t. 78 yrs., g.r. 7*l.*, e.r. 36*l.* 350

By NEWBON, EDWARDS, & SHEPHARD.

Pimlico.—5, Warwick-sq., u.t. 32 yrs., g.r. 1*l.*, y.r. 155*l.* 1,570
St. Luke's.—50, Gee-st., f., y.r. 31*l.* 16s. 502
Camden Town.—Gt. College-st., i.g.r. 15*l.* 10s., u.t. 27 yrs., g.r. nil 190
Kentish Town.—123, Leighton-rd., u.t. 38½ yrs., g.r. 5*l.* 5s., w.r. 70*l.* 16s. 380
6 and 7, Leighton-grove, u.t. 38½ yrs., g.r. 10*l.*, w.r. 132*l.* 12s. 720
Holloway.—Fonthill-rd., f.g.r.'s 28*l.*, reversion in 62 yrs. 760
519 and 523, Liverpool-rd., f., y.r. 76*l.* 980
Oxford-st.—13, Berwick-st. (S.), f., y.r. 130*l.* 3,275
Stratford.—Western-st., f.g.r.'s 20*l.*, reversion in 59 yrs. 475
St. Pancras.—Aldenham-st., f.g.r.'s 30*l.*, reversion in 59 yrs. 680

By MORLEY PHILLIPS, SONS, & MARTIN.

Edgware-rd.—No. 72 (S.); also 12, Stourcliffe-st.; profit rentals of 100*l.* for 19 yrs. and 48*l.* for 30 yrs. 1,400

By MARTIN VIGERS.

Regent's Park.—5, St. Edmund's-ter., u.t. 22 yrs., g.r. 2*l.*, p. 300

By WHITE, DRUCE, & BROWN.

St. John's Wood.—12, Abbey-rd., u.t. 15 yrs., g.r. 10*l.*, y.r. 70*l.* 615
23 and 24, Elm Tree-rd., and 18, Grove End-rd., u.t. 15 yrs., g.r. 15*l.* 15s., y.r. 110*l.* 860
20, Grove End-rd., u.t. 15 yrs., g.r. 15*l.* 15s., y.r. 80*l.* 550
31, Grove End-rd., u.t. 15 yrs., g.r. nil, y.r. 80*l.* 670
Grove End-rd., &c., f.g.r. 15*l.* 15s. reversion in 14 yrs. 1,405
Marylebone.—58, Church-st. (S.), and 61, Carlisle-st., u.t. 19½ yrs., g.r. 12*l.*, y.r. 90*l.* 625
Little Carlisle-st., &c., i.g.r. 25*l.*, u.t. 19½ yrs., g.r. nil 200
Maida Hill.—17 and 18, Aberdeen-pl., u.t. 21 yrs., g.r. 40*l.*, y.r. 89*l.* 385
Ealing.—28, Castlebar-rd., f., p. 750

By BARKERS'.

Leytonstone.—56, Beechcroft-rd., f., e.r. 28*l.* 300

By H. J. BLISS & SONS.

Hackney.—45 to 51 (odd), Morning-lane, u.t. 71½ yrs., g.r. 20*l.*, y.r. 120*l.* 1,065
Bethnal Green.—1 to 9, Parliament-pl., f., w.r. 135*l.* 4s. 1,175
Poplar.—272, High-st., f., y.r. 30*l.* 405
Ilford.—High-rd., f.g.r. 34*l.*, reversion in 92 yrs. 930
Mile End.—33, Globe-rd., and 1, Willow-st., f., w.r. 49*l.* 8s. 555
6 and 7, North-st., f., w.r. 49*l.* 8s. 450
27 and 29, Hunt-st., f., w.r. 70*l.* 4s. 875
St. George's, East.—St. George's-st., The Bunch of Grapes p.-h., f., y.r. 50*l.* 820
Enfield Highway.—High-rd., freehold house and shop, and six cottages, also The Rose and Crown Yard and land adjoining, w.r. 82*l.* 4s. 950

Contractions used in these lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e. for estimated rental; w.r. for weekly rental; y.r. for yearly rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; av. for avenue; gdns. for gardens; yd. for yard.

PRICES CURRENT OF MATERIALS.

*** Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.

	£ s. d.			
Hard Stocks	1 11 0	per 1,000	alongside,	in river
Rough Stocks and Grizzles	1 9 0	,,	,,	,,
Facing Stocks	2 12 0	,,	,,	,,
Shippers	2 5 0	,,	,,	,,
Flettons	1 8 0	,,	at railway	depôt.
Red Wire Cuts ..	1 12 0	,,	,,	,,
Best Fareham Red	3 12 0	,,	,,	,,
Best Red Pressed Ruabon Facing.	5 5 0	,,	,,	,,
Best Blue Pressed Staffordshire ..	4 6 6	,,	,,	,,
Do., Bullnose	4 11 0	,,	,,	,,
Best Stourbridge Fire Bricks	4 6 0	,,	,,	,,

GLAZED BRICKS

Best White and Ivory Glazed Stretchers.....	13 0 0	,,	,,	,,
Headers	12 0 0	,,	,,	,,
Quoins, Bullnose, and Flats	17 0 0	,,	,,	,,
Double Stretchers	19 0 0	,,	,,	,,
Double Headers..	16 0 0	,,	,,	,,
One Side and two Ends	19 0 0	,,	,,	,,
Two Sides and one End	20 0 0	,,	,,	,,
Splays, Chamfered, Squints.....	20 0 0	,,	,,	,,
Best Dipped Salt Glazed Stretchers and Headers ..	12 0 0	,,	,,	,,
Quoins, Bullnose, and Flats	14 0 0	,,	,,	,,
Double Stretchers	15 0 0	,,	,,	,,
Double Headers..	14 0 0	,,	,,	,,
One Side and two Ends	15 0 0	,,	,,	,,
Two Sides and one End	15 0 0	,,	,,	,,
Splays, Chamfered, Squints.....	14 0 0	,,	,,	,,
Seconds Quality White and Dipped Salt Glazed....	2 0 0	less than best.		

	s. d.		
Thames and Pit Sand	7 3	per yard,	delivered.
Thames Ballast	6 0	,,	,,
Best Portland Cement	31 0	per ton,	delivered
Best Ground Blue Lias Lime..	25 0	,,	,,

NOTE.—The cement or lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime..... 10s. 6d. per yard, delivered
Stourbridge Fire-clay in sacks, 26s. 6d. per ton at rly. dpt.

STONE.

	s. d.		
Ancaster in blocks	1 11	per ft. cube,	deld. rly. depot.
Bath ,, ...	1 7	,,	,,
Farleigh Down Bath ..	1 8	,,	,,
Beer in blocks	1 6	,,	,,
Grinshill ,, ...	1 10	,,	,,
Brown Portland in blocks	2 2	,,	,,
Darley Dale in blocks..	2 4	,,	,,
Red Corsehill ,,	2 5	,,	,,
Closeburn Red Freestone	2 3	,,	,,
Red Mansfield ,,	2 4	,,	,,
Hard York in blocks ..	2 10	,,	,,

Hard York 6 in. sawn both sides landings, to sizes (under 40 ft. sup.)	2 8	per ft. super.	at rly. depôt.	
,, ,, 6 in. Rubbed Ditto..	3 0	,,	,,	
,, ,, 3 in. sawn both sides slabs (random sizes)	1 3	,,	,,	
,, ,, 2 in. self-faced Ditto	0 9½	,,	,,	
Hopton Wood (Hard Bed) in blocks	2 3	per ft. cube. deld. rly. depôt.		
,, ,, ,, 6 in. sawn both sides landings	2 7	per ft. super. deld. rly. depôt.		
,, ,, ,, 3 in. do.	1 2½	,,	,,	

SLATES.

in. in.	£ s. d.		
20×10 best blue Bangor..	12 0 0	per 1000 of 1200	at ry. dep.
,, best seconds ,,	11 10 0	,,	,,
16×8 best ,,	6 17 6	,,	,,
20×10 best blue Portmadoc	11 7 6	,,	,,
16×8 best blue Portmadoc	6 5 0	,,	,,
20×10 best Eureka unfading green....	13 10 0	,,	,,
16×8 ,, ,,	7 10 0	,,	,,
20×10 permanent green	10 10 0	,,	,,
16×8 ,, ,,	6 0 0	,,	,,

TILES.

	s. d.		
Best plain red roofing tiles..	41 6	per 1,000,	at rly. depôt.
Hip and valley tiles....	3 7	per doz.	,, ,,
Best Broseley tiles	48 6	per 1,000	,, ,,
Hip and valley tiles....	4 0	per doz.	,, ,,
Best Ruabon Red, brown or brindled Do. (Edwards)	57 6	per 1,000	,, ,,
Do. ornamental Do.	60 0	,,	,, ,,
Hip tiles	4 0	per doz.	,, ,,
Valley tiles	3	,,	,, ,,
Best Red or Mottled Staffordshire Do. (Peakes) .	50 9	per 1,000	,, ,,
Hip tiles	4 1	per doz.	,, ,,
Valley tiles.....	3 8	,,	,, ,,

[*See also page* 577.

COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

(For some Contracts, &c., still open, but not included in this List, see previous issues.)

COMPETITIONS.

Nature of Work.	By whom Advertised.	Premiums	Designs to be delivered
*Memorial to Queen Victoria at Allahabad	The Committee	2,000 Rupees	Nov.

CONTRACTS.

Nature of Work or Materials.	By whom Advertised.	Forms of Tender, &c., Supplied by	Tenders to be delivered
*Detached Houses and Shops, Enfield	.....	Crukmay & Sons, Architects, 13, Victoria-street, S.W.	June 5
*Baths and Washhouses, Mansfield, Haggerston	Shoreditch Borough Council	A. W. S. Cross, 58, Conduit-street, Regent-street, W.	June 7
Artisans' Dwellings, Walker-road, &c.	Newcastle-on-Tyne Corporation	Liddle & Brown, Architects, Newcastle	June 10
Brick Culvert, Coventry-street, &c.	Nuneaton U.D.C.	J. S. Pickering, Civil Engineer, Council Offices, Nuneaton	do.
Hospital, Rhiwfelen, Fawr	Llantrisant R.D.C.	G. S. Morgan, Surveyor, School-street, Pontyclun	do.
Twenty-eight Houses, Abercynon	.....	W. Dowdeswell, Architect, John-street, Treharris	do.
School, Heaton	Newcastle-upon-Tyne Sch. Board	S. D. Robins, Architect, Percy-street, Newcastle	do.
Sewers, &c.	Bridgwater (Somerset) Tn. Council	Borough Surveyor, Municipal Buildings, Bridgwater	do.
Banking Premises, &c., Darlington	North-Eastern Banking Company.	Clark & Moscrop, Architects, Darlington	do.
Rebuilding Shops, &c., Fore-street, Redruth	Messrs. T. Moore & Co.	S. Hill, Architect, Green-lane, Redruth	June 11
Alterations to Premises, Bishop Auckland	Mr. A. Guthrie	F. H. Livesay, Architect, Bishop Auckland	do.
Villas, Pencisely-road, Cardiff	Pencisely Estate Co., Ltd.	P. E. Hill, Surveyor, 23, St. Mary-street, Cardiff	do.
Additions to Oakville, Oxford-road, Dewsbury	.....	J. Kirk & Sons, Architects, Dewsbury	do.
Laundry, Stabling, &c., Dowlais, S. Wales	.....	W. Dowdeswell, Architect, Treharris	do
Workshops, &c., Spring Hill, Accrington	.....	H. Ross, 15, Cannon-street, Accrington	do.
Cottage, Aspatria	.....	W. Sanderson, 45, Park-road, Aspatria	do.
Additions to Church, Allerton Bywater	.....	A. Hartley, Architect, Castleford	do.
Bakery, &c., North Shields	Mr. P. Brown	F. R. N. Haswell, Architect, 77, Tyne-street, North Shields	do.
*New Schools	Salford Corporation	Benjamin Bower, 14, Temple-street, Birmingham	do.
Shop Premises, Fore-street, Redruth	.....	S. Hill, Architect, Green-lane, Redruth	do.
Schools, Blackfriars-road	Salford Corporation	B. Bower, 14, Temple-street, Birmingham	do.
Asylum Chapel, Omagh	.....	J. L. Donnelly, Architect, Omagh	June 12
*Laying New Flooring, St. George's Workhouse	Southwark Union	G. D. Stevenson, Architect, 13 & 14, King-street, E.C.	do.
Church Restoration, Greetham, near Horncastle	.....	C. H. Fowler, Architect, Durham	do.
Additions, &c., to National Schools, Bingley	.....	W. R. Nunns, Architect, Market-street, Bingley	do.
Pavilion at Sanatorium, Bear-road, Brighton	.....	F. J. C. May, Civil Engineer, Town Hall, Brighton	do.
House, Brigshaw-road, Allerton Bywater, Yorks	Mr. G. Johnson	A. Hartley, Architect, Castleford	do.
Villa, Shantallow, Londonderry	Mr. F. M'Laughlin	J. P. M'Grath, Architect, 28, Carlisle-road, Londonderry	do.
Boiler House, &c., at Workhouse, Clayton	North Bierley Guardians	S. Spencer, Architect, Great Horton-road, Bradford	do.
Underground Convenience, Victoria-street	Manchester Corporation	City Surveyor, Town Hall, Manchester	June 13
Laundry, &c., at School, Wapping-road	Bradford School Board	Clerk, School Board Offices, Manor-row, Bradford	do.
School, Lapage-street	do.	T. Garbutt, School Board Offices, Manor-row, Bradford	do.
Mill, &c., Snake Hill, Brighouse	.....	G. Hepworth, Architect, 20, Bradford-road, Brighouse	do.
House, Fernhurst-road, Cork	.....	W. H. Hill & Son, Architects, 28, South Mall, Cork	do.
Five Houses, Norfolk-road, Carlisle	.....	Johnstone Bros., Architects, Lowther-street, Carlisle	June 14
School, Skewen, Wales	Coedfranc School Board	J. C. Rees, Architect, St. Thomas Chambers, Neath	do.
Culvert, Ford Valley, Devonport	.....	A. B. Pilling, Town Hall, Devonport	do.
Schools, Idle, near Bradford	.....	Kay & Long, Architects, 10, St. Paul's-street, Leeds	do.
Additions to School, Loddon, Norfolk	Hales, &c., School Board	A. Pells, Architect, Beccles	do.
Water Supply Works, Boldron, near Barnard Castle	Startforth R.D.C.	J. E. Parker, Civil Engr., Post Office Chmbrs., Newcastle-on-Tyne	do.
Reservoir, Cwmtillery	Abertillery U.D.C.	T. Rees, Civil Engineer, Corn Exchange Chambers, Newport, Mon	do.
Chapel, &c.	Hadley (Salop) Parish Council	G. R. Dalgleish, Architect, Talbot Chambers, Shrewsbury	do.
Additions to Chapel, Cwmaman, Wales	.....	T. Roderick, Architect, Clifton-street, Aberdare	June 16
*Sewerage and Road-making Works	Hornsey U.D.C	Council's Engineer, Southwood-lane, Highgate, N.	do.
Additions to Public Baths	Mansfield Corporation	R. F. Vallance, Borough Surveyor, Town Hall, Mansfield	do.
Alterations to Town Hall	do.	do.	do.
Chimney Shaft, &c., High-street	Worthing Corporation	Borough Surveyor, Municipal Offices, Worthing	do.
Water Supply Works, Bovey Tracey	Newton Abbot R.D.C.	W. Fox & R. Tatton, Civil Engineers, 5, Victoria-street, S.W.	June 17
*Dwellings for Working Class	St. Pancras Borough Council	Keith D. Young, Architect, 17, Southampton-street, W.C.	do.
House, Shop, &c., Red Row, Broomhill	Co-operative Society	T. Tulip, Whinney Hill, Choppington	do.
Cast Iron Pipes (120 tons)	Newton Abbot R.D.C.	Fox & Tatton, Civil Engineers, 5, Victoria-street, S.W.	do.
Five Shops, Hall, &c., Chapel-street	Rugby Co-operative Society	J. T. Franklin, Architect, Regent-street, Rugby	do.
*Erection of Dwellings for Working Classes	London County Council	Architect's Department, 19, Charing Cross-road, S.W.	do.
*Reconstruction of Hadham Mill Bridge	Herts County Council	Urban A. Smith, 41, Parliament-street, S.W.	June 18
Chapel, Rhos, near Ruabon	.....	R. Owens & Son, Architects, 3, Crosshall-street, Liverpool	do.
Alterations, Holmfield, Halifax	.....	F. Fielding, Architect, 7, Fountain-street, Halifax	do.
Rebuilding Empress Inn, Alfred Gelder-street	Hull Corporation	J. H. Hirst, Architect, Town Hall, Hull	do.
*Making-up and Paving Streets, &c.	Fulham Borough Council	Council's Surveyor, Town Hall, Fulham, S.W.	do.
Culvert, Broadweir	Bristol Corporation	T. H. Yabbicom, Civil Engineer, 63, Queen-square, Bristol	do.
*Wood Paving Works	Hampstead Borough Council	Council's Engineer, Town Hall, Haverstock Hill, N.W.	June 19
*New Branch Library, West Ealing	Ealing Local Board	Council's Engineer, Town Hall, Ealing	do.
*Making-up Roads	do.	do.	do.
*Engine and Accumulator Rooms, Boiler Settings, &c.	Fulham Guardians	F. H. Medhurst, Engineer, 13, Victoria-street, S.W.	do.
*Public Conveniences, South End Green	Hampstead Borough Council	Borough Engineer, Town Hall, Hampstead, N.W.	do.
*New Church, Badshot Lea, near Aldershot	The Committee	Mission Church, Badshot Lea	do.
Sewerage Works	Pontefract Town Council	Baldwin Latham, Civil Engineer, Victoria-street, Westminster	June 21
*Public Baths	Acton District Council	Council's Surveyor, 242, High-street, Acton, W.	June 24
*Making-up Janet, &c., Roads	County Borough West Ham	Borough Engineer, Town Hall, West Ham, E.	do.
*Stoneware, &c.	South Stoneham R.D.C.	Bailey-Denton, Son, Lawford & Symons, Palace-chmb. Westminster	July 7
Convalescent Hospital at Carshalton	Metropolitan Asylums Board	Treadwell & Marten, 2, Waterloo-place, Pall Mall, S.W.	July 16
Additions to Schools, Cockermouth	.....	G. Dale Oliver, Architect, Cockermouth	No date
Bridge over River Lune, Gaisgill, Westmorland	.....	J. Bentley, County Surveyor, 7, Lowther-street, Kendal	do.
Villa, Green-street, Sittingbourne	.....	—. Lucas, Albert House, Teynham, Sittingbourne	do.
Bridge Works	Wetherby (Yorks) R.D.C.	J. House, Engineer, Montpellier Chambers, Harrogate	do.
*Nurses' Home, Southampton	Royal South Hants, &c., Hosp. Com.	Ruault & Young, 17, Southampton-street, W.C.	do.
Relaying Gas Main, 900 yards	Sheppy Gas Co.	H. Barber, 2, Trinity-road, Sheerness	do.
Alterations, Highfield House, Hardwick Mount, Buxton	Mrs. G. Hobson	Garlick & Flint, Architects, Buxton	do.
Granite Road Metal	Loughborough (Leics.) Corporation	A. H. Walker, Civil Engineer, Town Hall, Loughborough	do.
Additions to Cemetery	Brinklow (Coventry) Prsh. Council	H. Newitt, Council Offices, Brinklow	do.
Church, St. Ann's Well-road, Nottingham	.....	A. E. Lambert, Architect, 22, Park-row, Nottingham	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Required.	Salary.	Application to be in
*Engineering Assistant	Acton U.D.C.	135*l.*	June 10
*Temporary Sanitary Engineer	Chelsea Guardians	3*l.* 10*s.* per week	June 11
*Assistant	County Borough West Ham	130*l.* per annum	June 14
*Clerk of Works	St. Pancras Borough Council	3*l.* 10*s.* per Week	June 17
*Clerk of Works	Beckenham U.D.C.	3*l.* per week	June 21
*Assistant Engineer	Rangoon Municipality	See Advertisement	July 3
*Temporary Assistant	Battersea Borough Council	Not stated	No date

Those marked with an asterisk (*) are advertised in this Number. *Competition, p. iv. Contracts, pp. iv. vi. viii. & x. Public Appointments, xx. & xxi.*

PRICES CURRENT (*Continued*).

WOOD.

BUILDING WOOD.—YELLOW.

	At per standard. £ s. d.	£ s. d.
Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in.	14 10 0	16 0 0
Deals: best 3 by 9	13 10 0	15 0 0
Battens: best 2½ in. by 7 in. and 8 in., and 3 in. by 7 in. and 8 in.	10 10	11 10 0
Battens: best 2½ by 6 and 3 by 6 ..	0 10 0	less than 7 in. and 8 in.
Deals: seconds	1 0 0	less than best
Battens: seconds	0 10 0	„ „ „
2 in. by 4 in. and 2 in. by 6 in. ..	8 10 0	9 10 0
2 in. by 4½ in. and 2 in by 5 in. ..	8 0 0	9 0 0
Foreign Sawn Boards— 1 in. by 12 in. by 12 in.	0 10 0	more than battens.
¼ in.	1 0 0	„
Fir timber: Best middling Danzig or Memel (average specification)	At per load of 50 ft. 4 10 0	5 0 0
Seconds	4 5 0	4 10 0
Small timber (8 in. to 10 in.)	3 12 6	3 15 0
Swedish balks	2 15 0	3 0 0
Pitch-pine timber (30 ft.)	3 0 0	3 10 0
JOINERS' WOOD.	At per standard.	
White Sea: First yellow deals, 3 in. by 11 in.	22 0 0	23 0 0
3 in. by 9 in.	20 0 0	21 0 0
Battens, 2½ in. and 3 in. by 7 in.	16 10 0	18 0 0
Second yellow deals, 3 in. by 11 in.	18 0 0	20 0 0
„ „ 3 in. by 9 in.	16 10 0	18 10 0
Battens, 2½ in. and 3 in. by 7 in.	13 0 0	14 0 0
Third yellow deals, 3 in. by 11 in. and 9 in.	14 0 0	15 10 0
Battens, 2½ in. and 3 in. by 7 in.	11 10 0	12 10 0
Petersburg: first yellow deals, 3 in. by 11 in.	20 0 0	21 0 0
Do. 3 in. by 9 in.	17 0 0	18 0 0
Battens	13 0 0	14 0 0
Second yellow deals, 3 in. by 11 in.	15 0 0	16 10 0
Do. 3 in. by 9 in.	13 10 0	14 10 0
Battens	11 0 0	12 0 0
Third yellow deals, 3 in. by 11 in.	12 10 0	13 10 0
Do. 3 in. by 9 in.	12 0 0	13 0 0
Battens	10 0 0	11 0 0
White Sea and Petersburg: — First white deals, 3 in. by 11 in.	14 0 0	15 0 0
„ „ „ 3 in. by 9 in.	13 0 0	14 0 0
Battens	11 0 0	12 0 0
Second white deals 3 in. by 11 in.	13 0 0	14 0 0
„ „ „ 3 in. by 9 in.	12 0 0	13 0 0
„ „ „ battens	9 10 0	10 10 0
Pitch-pine: deals	16 0 0	18 0 0
Under 2 in. thick extra	0 10 1	0 0 0
Yellow Pine—First, regular sizes	32 0 0	33 10 0
Broads (12 in. and up)	2 0 0	more.
Oddments	22 0 0	24 0 0
Seconds, regular sizes	24 10 0	26 10 0
Yellow Pine Oddments	20 0 0	22 0 0
Kauri Pine—Planks, per ft. cube	0 3 6	0 4 6
Danzig and Stettin Oak Logs— Large, per ft. cube	0 2 6	0 3 0
Small „ „	0 2 3	0 2 6
Wainscot Oak Logs, per ft. cube	0 5 0	0 5 6
Dry Wainscot Oak, per ft. sup. as inch	0 0 7½	0 0 8
¾ in. do. do.	0 0 7	- - -
Dry Mahogany— Honduras, Tabasco, per ft. sup. as inch	0 0 9	0 0 11
Selected, Figury, per ft. sup. as inch	0 1 6	0 2 0
Dry Walnut, American, per ft. sup. as inch	0 0 10	0 1 0
Teak, per load	16 0 0	20 0 0
American Whitewood Planks— Per ft. cube	0 3 0	0 3 6
Prepared Flooring—	Per square.	
1 in. by 7 in. yellow, planed and shot	0 13 0	0 16 6
1 in. by 7 in. yellow, planed and matched	0 13 6	0 17 6
1¼ in. by 7 in. yellow, planed and matched	0 15 0	1 0 0
1 in. by 7 in. white, planed and shot	0 11	0 12 6
1 in. by 7 in. white, planed and matched	0 11 6	0 13 6
1¼ in. by 7 in. white, planed and matched	0 13 6	0 15 6

6 in. at 6d. per square less than 7 in.

JOISTS, GIRDERS, &c.

	In London, or delivered Railway Vans, per ton. £ s. d.	£ s. d.
Rolled Steel Joists, ordinary sections	6 2 6	7 2 6
Compound Girders „ „	7 17 6	8 17 6
Angles, Tees and Channels, ordinary sections	7 17 6	8 17 6
Flitch Plates	8 5 0	8 15 0
Cast Iron Columns and Stanchions, including ordinary patterns	7 0 0	8 0 0

METALS.

	Per ton, in London £ s. d.	£ s. d.
IRON— Common Bars	7 15 0	8 5 0
Staffordshire Crown Bars, good merchant quality	8 5 0	8 15 0
Staffordshire "Marked Bars"	10 10 0	- - -
Mild Steel Bars	9 0 0	9 10 0
Hoop Iron, basis price	9 5 0	9 10 0
„ galvanised	16 0 0	- - -
(* And upwards, according to size and gauge.)		
Sheet Iron, Black.— Ordinary sizes to 20 g.	10 0 0	- - -
„ „ to 24 g.	12 0 0	- - -
„ „ to 26 g.	12 10 0	- - -
Sheet Iron, Galvanised, flat, ordinary quality.— Ordinary sizes, 6 ft. by 2 ft. to 3 ft. to 20 g.	12 15 0	- - -
„ „ 22 g. and 24 g.	13 5 0	- - -
„ „ 26 g.	14 5 0	- - -

PRICES CURRENT (*Continued*)

METALS.

IRON—	Per ton, in London. £ s. d.	£ s. d.
Sheet Iron, Galvanised, flat, best quality:— Ordinary sizes to 20 g.	16 0 0	- - -
„ „ 22 g. and 24 g.	16 10 0	- - -
„ „ 26 g.	18 0 0	- - -
Galvanised Corrugated Sheets.— Ordinary sizes, 6 ft. to 8 ft. 20 g.	12 15 0	- - -
„ „ 22 g. and 24 g.	13 5 0	- - -
„ „ 26 g.	14 5 0	- - -
Best Soft Steel Sheets, 6 ft. by 2 ft. to 3 ft. by 20 g. and thicker	12 0 0	- - -
„ „ 22 g. and 24 g.	13 0 0	- - -
„ „ 26 g.	14 5 0	- - -
Cut nails, 3 in. to 6 in.	9 5 0	9 15 0
(Under 3 in. usual trade extras.)		

LEAD, &c.

	Per ton in London. £ s. d.	£ s. d.
LEAD—Sheet, English, 3 lbs. & up.	14 2 6	- - -
Pipe in coils	14 12 6	- - -
Soil Pipe	17 2 6	- - -
ZINC—Sheet— Vieille Montagne ton	24 10 0	- - -
Silesian	24 0 0	- - -
COPPER— Strong Sheet per lb	0 0 10	- - -
Thin „	0 0 11	- - -
Copper nails „	0 0 11	- - -
BRASS— Strong Sheet „	0 0 10	- - -
Thin „	0 0 10½	- - -
TIN—English Ingots „	0 1 5	- - -
SOLDER—Plumbers' „	0 0 7	- - -
Tinmen's „	0 0 9	- - -
Blowpipe „	0 0 10½	- - -

ENGLISH SHEET GLASS IN CRATES.

15 oz. thirds	2¼d. per ft. delivered.
„ fourths	2d. „ „
21 oz. thirds	3d. „ „
„ fourths	2⅞d. „ „
26 oz. thirds	4¼d. „ „
„ fourths	3⅞d. „ „
32 oz. thirds	5½d. „ „
„ fourths	4⅞d. „ „
Fluted sheet, 15 oz.	3d. „ „
„ 21 „	4d. „ „
⅛ Hartley's Rolled Plate	1⅞d. „ „
3/16 „ „ „	2⅝d. „ „
¼ „ „ „	2⅞d. „ „

OILS, &c.

		£ s. d.
Raw Linseed Oil in pipes or barrels	per gallon	0 2 11
„ „ „ in drums	„	0 3 2
Boiled „ „ in pipes or barrels	„	0 3 1
„ „ „ in drums	„	0 3 4
Turpentine, in barrels	„	0 2 11
„ in drums	„	0 3 1
Genuine Ground English White Lead	per ton	21 0 0
Red Lead, Dry	„	20 0 0
Best Linseed Oil Putty	per cwt.	0 8 6
Stockholm Tar	per barrel	1 12 0

VARNISHES, &c.

	Per gallon. £ s. d.
Fine Elastic Copal Varnish for outside work	0 16 0
Best Elastic Copal Varnish for outside work	1 0 0
Best Elastic Carriage Varnish for outside work	0 16 0
Best Hard Oak Varnish for inside work	0 10 0
Best Extra Hard Church Oak Varnish for inside work	0 10 6
Fine Hard Copal Varnish for inside work	0 16 0
Best Hard Copal Varnish for inside work	1 0 0
Best Hard Carriage Varnish for inside work	0 16 0
Extra Pale Paper Varnish	0 12 0
Best Japan Gold Size	0 10 6
Best Black Japan	0 16 0
Oak and Mahogany Stain	0 9 0
Brunswick Black	0 8 6
Berlin Black	0 16 0
Knotting	0 10 0
Best French and Brush Polish	0 10 0

TO CORRESPONDENTS.

NOTE.—The responsibility of signed articles, letters, and papers read at meetings rests, of course, with the authors.

We cannot undertake to return rejected communications.

Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT DESIRED.

We are compelled to decline pointing out books and giving addresses.

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All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and *not* to the Editor.

TENDERS.

[Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than 10 a.m. on Thursdays.* N.B.—We cannot publish Tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is given, nor any list in which the lowest Tender is under 100*l.*, unless in some exceptional cases and for special reasons.]

* Denotes *accepted.* † Denotes *provisionally accepted.*

ABERDARE.—For the erection of two houses, stable, &c., Currie-st., &c., Aberaman. Mr. Fisher Thomas, architect, Pontypridd:—

Wm. Evans, Aberaman .. £574

AXBRIDGE (Somerset).—For the erection of infirmary buildings, for the Guardians. Mr. A. Powell, C.E., 3, Unity-street, College-green, Bristol:—

Stephens, Bastow, & Co.	£6,997 0	Ford & Sons	£6,045 15
Wills & Sons	6,970 0	C. Addicott, Weston-super-Mare*	5,720 0
H. B. Neal	6,886 0	C. Bryer	5,680 0
A. J. Bevan	6,300 0	A. J. Colborne	5,568 8
Sollard	6,200 0	G. Sprake	5,523 0
Walters	6,200 0		

BARROW-IN-FURNESS. — For the erection of a fish market, for the Corporation. Borough Engineer, Town Hall, Barrow:—

T. Brown, Barrow £1,470

BOSTON (Lincs.). — For additions, &c., to fever hospital, Skirbeck, for the Urban District Council. Mr. Jas. Rowell, architect, Borough Offices, Boston:—

J. W. Pinder	£458 0 0	Wm. Greenfield	£425 0 0
Hipwell & Co.	438 0 0	T. H. Cade	409 10 0
J. Leafe	427 14 3	J. Lucas, Boston*	390 0 0

BRIDLINGTON.—For the erection of a residence for Mr. F. Creaser. Mr. J. Earnshaw, architect, Carlton House, Bridlington:—

E. Corner	£1,085 10 0	W. A. Storr	£828 0 0
T. Spink	970 0 0	A. Wilis	808 0 0
J. H. Hudson	927 10 0	F. Flintoft	755 0 0
A. Gardam	883 17 6	J. Rinnard	625 0 0
A. Booth	860 0 0	T. Gray*	612 0 0
F. Kneeshaw	847 0 0		

[All of Bridlington.]

CEFN (Wales).—For the erection of house and shop, Well-street, for Mr. Bowen. Mr. J. W. Hughes, architect, Dee Hurst, Llangollen:—

J. T. Jones, Cefn, Ruabon* £525

CHARMINSTER (Dorset).—For the erection of a house for 100 private patients at Herrison, near Dorchester, for the County Council. Mr. George T. Hine, architect, 35, Parliament-street, S.W.:—

Wills & Sons	£49,880	Willcock & Co.	£42,750
Pethick Bros.	46,944	Parnell & Sons	42,204
Wakeham Bros.	46,514	J. M. Patrick	41,732
Pattinson & Sons	46,500	Stephens, Bastow, & Co.	41,693
E. C. Bull	46,368	W. A. Blake	39,957
King & Sons	44,432	Moss & Sons, Ltd., Loughborough†	39,500
Jenkins & Sons, Ltd.	43,000		
W. J. Bloxham	43,497		

CHELTENHAM.—For the erection of a chalet, Pittville Park, for the Corporation. Mr. Joseph Hall, M.Inst.C.E., Borough Surveyor, Municipal Offices, Cheltenham:—

Collins & Godfrey	£385	A. C. & S. Billings, Cheltenham*	£375

GOSPORT.—For the erection of a Congregational church, Locks Heath. Mr. R Lowe, C.E., architect, 57, Gordon-road, Gosport. Quantities by the architect:—

G. H. Hackett	£1,180	Lave Bros.	£1,050
R. W. Lowe	1,111	J. Hunt	1,015
R. M. Middelton	1,099	W. T. Dugan	991
Lear & Son	1,090	J. Cload	950
		C. M. Dash*	898

[Architect's estimate, £957 12s. 10d.]

KEIGHLEY.—For the erection of laundry buildings, house, stabling, &c., Riddlesden. Mr. Henry Smith, architect, Compton Buildings, Keighley. Quantities by Henry Smith:—

Masonry.—W. Baker, Keighley*	£414 0 0
Joinery.—J. Hartley, Keighley*	123 0 0
Plumbing.—W. Bottomley, Keighley*	57 0 0
Slating.—W. Thornton, Bingley*	46 0 0
Plastering.—A. Sawley, Keighley*	20 3 0
Painting.—T. Harrison, Keighley*	6 13 4

LONDON.—For alterations and additions to West Hill Lodge, Sydenham. Mr. J. Randall Vining, architect, 89, Chancery-lane, W.C.:—

Black & Son	£521	J. & C. Bowyer*	£465
Marsland & Son	497		

LONDON.—For the erection of a disinfecting chamber, stabling, &c., at Wanless-road, Loughborough Junction, for the Lambeth Borough Council. Mr. Henry Edwards, C.E., Borough Engineer:—

	Disinfecting Chamber.	Stabling.
Foster Bros., Norwood Junction	£3,136	£924
Chenum & Sons, West Norwood	2,718	960
G. Parker, Peckham	2,575	995
B. E. Nightingale, Albert Embankment	2,568	875
Smith & Son, South Norwood	2,525	893
Rice & Son, Stockwell-road	2,517	918
J. Parsons, Waterloo-road	2,500	887
T. G. Minter, Page-street	2,487	900
J. O. Richardson, Peckham	2,486	881
Edwards & Medway, Kennington-road	2,484	870
Whitehead & Co., Clapham-rd.	2,450	895
Lowden & Sons, Upper Tooting	2,433	900
T. G. Sharpington, Nunhead	2,288	888
J. Ham, Denmark Hill	2,192	885

MANCHESTER.—For the erection of a house, Didsbury, for Dr. Geo. E. Crowe. Messrs. C. K. & T. C. Mayor, architects, 41, John Dalton-street, Manchester:—

Padmore & Sons	£1,652	Burgess & Galt	£1,430
McFarlane & Son	1,565	Amos Mason, Didsbury*	1,385
Megarity & Co.	1,546	R. Carlyle	1,377
E. Jackson	1,500		

MORTLAKE.—For the erection of two shops, and alterations to other buildings. Mr. Ernest Pennington, surveyor, Richmond:—

W. N. Street	£1,525	E. Seaber	£1,450
Hughes & Co.	1,480	J. W. Brooking‡	1,429

‡ Accepted subject to modifications.

[*See also next page.*

TROEHAMPTON.—For the erection of stabling, "Downshire Lodge," for Mr. Hugh C. Smith. Mr. Ernest Pennington, surveyor, Richmond :—

Adkins & Sons	£385 0	Seal & Co.	£340 10
Adamson & Sons	350 0	E. Seaber*	300 0

ST. MARGARET'S.—For general repairs to thirty-one houses, Orchard-road. Mr. Ernest Pennington, surveyor, Richmond :—

H. Snell* £182 10

LONDON SCHOOL BOARD TENDERS.

At the last meeting of the London School Board, the Works Committee submitted the following lists of tenders. Mr. T. J. Bailey is the Board's Architect :—

** Recommended for acceptance.*

The work at the following schools will have to be done during the summer holidays—July 25 to August 23, 1902. Where exterior as well as interior work has to be done, an additional week will be allowed for the former :—

ALMA.—Pupil teachers' school :—

Sayer & Son	£161	Belcher & Co.	£127
Johnson & Co.	139	J. Harries*	90
H. J. Williams	135		

BARRETT-STREET.—Painting interior :—

M. Pearson	£255 0	Bristow & Eatwell	£223 10
Chinchen & Co.	249 0	Marchant & Hirst	219 0
W. Chappell	235 0	T. Cruwys*	185 0

BROMLEY HALL-ROAD. — Painting interior of main school, and cleaning interior of J. M. school and I. B. :—

G. Wales	£639 10	Vigor & Co.	£514 10
Gibb & Co.	581 0	T. H. Jackson	510 0
J. F. Holliday	570 0	A. W. Derby	453 0
Corfield & Co.	555 0	A. J. Sheffield*	449 0

CALEDONIAN-ROAD.—Painting interior :—

J. R. Sims	£450 0	T. Cruwys	£376 0
C. & W. Hemmings	396 5	G. Kirby	364 0
Dearing & Sons	390 0	Stevens Bros.*	348 0

CORMONT-ROAD. — Painting interior and exterior :—

Lathey Bros.	£461 0	Rice & Son	£369 0
W. Y. Goad	397 0	Maxwell Bros., Ltd.	328 16
Holliday & Greenwood, Ltd.	394 0	E. Triggs*	327 0

CRAMPTON-STREET. — Painting interior (Main School and I.B.s) :—

J. Appleby	£768 0	Maxwell Bros., Ltd.	£639 0
Martin, Wells, & Co.	750 0	Sayer & Sons	562 15
W. Y. Goad	694 0	G. Kemp	546 0
		Rice & Son*	515 0

DREADNOUGHT-STREET.—Painting exterior :—

T. H. Jackson	£198	E. Proctor	£134
W. Banks	195	W. J. Howie*	128
Hayter & Sons	155		

ELEANOR-ROAD.—Painting interior and exterior :—

Barrett & Power	£564 0	G. Wales	£469 19
Collis, Willmott, & Son	407 0	G. Barker	435 0
Stevens Bros.	496 0	Marchant & Hirst	429 0
Silk & Son	492 10	Chessum & Sons	385 11
		W. Hornett*	355 16

FARRANCE-STREET.—Painting interior :—

G. Barker	£340	J. F. Holliday	£293
D. Gibb & Co.	293	Corfield & Co.	285
Vigor & Co.	294	A. W. Derby*	260

LYNDHURST GROVE.—Painting exterior :—

H. Line	£222	Johnson & Co.	£205
Blaek & Son	211	W. Y. Goad	196
J. F. Ford	206	W. Hooper*	180

MANSFORD-STREET. — Cleaning interior (S. M. and special), painting exterior (J. M.) :—

J. R. Sims	£850 0	G. Wales	£547 10
Collis, Willmott, & Sons	569 15	G. Barker	539 0
T. Cruwys	561 0	Haydon & Sons*	522 10

MIDWAY-PLACE.—Painting interior (old and new portions) :—

J. R. Sims	£507 0	W. Banks	£395 0
T. D. Leng	484 0	J. Harries	390 0
Belcher & Co.	438 0	Rice & Son	367 0
H. P. Williams	397 10	H. Groves*	289 0

NETHERWOOD-STREET.—Painting interior :—

Marchant & Hirst	£465 0	Bristow & Eatwell	£297 0
Chinchen & Co.	440 0	T. Cruwys*	233 0
W. Chappell	398 10		

REGENT-STREET.—Painting interior :—

Hayter & Sons	£375 0	H. Groves	£270 0
W. J. Howie	353 0	S. Musgrove*	241 16

SMALLWOOD-ROAD.—Painting interior and exterior :—

J. R. Sims	£761 0	Johnson & Co., Ltd.	£467 0
J. Watkins	489 0	E. Triggs	459 0
Lorden & Son	483 15	Garrett & Son*	449 0

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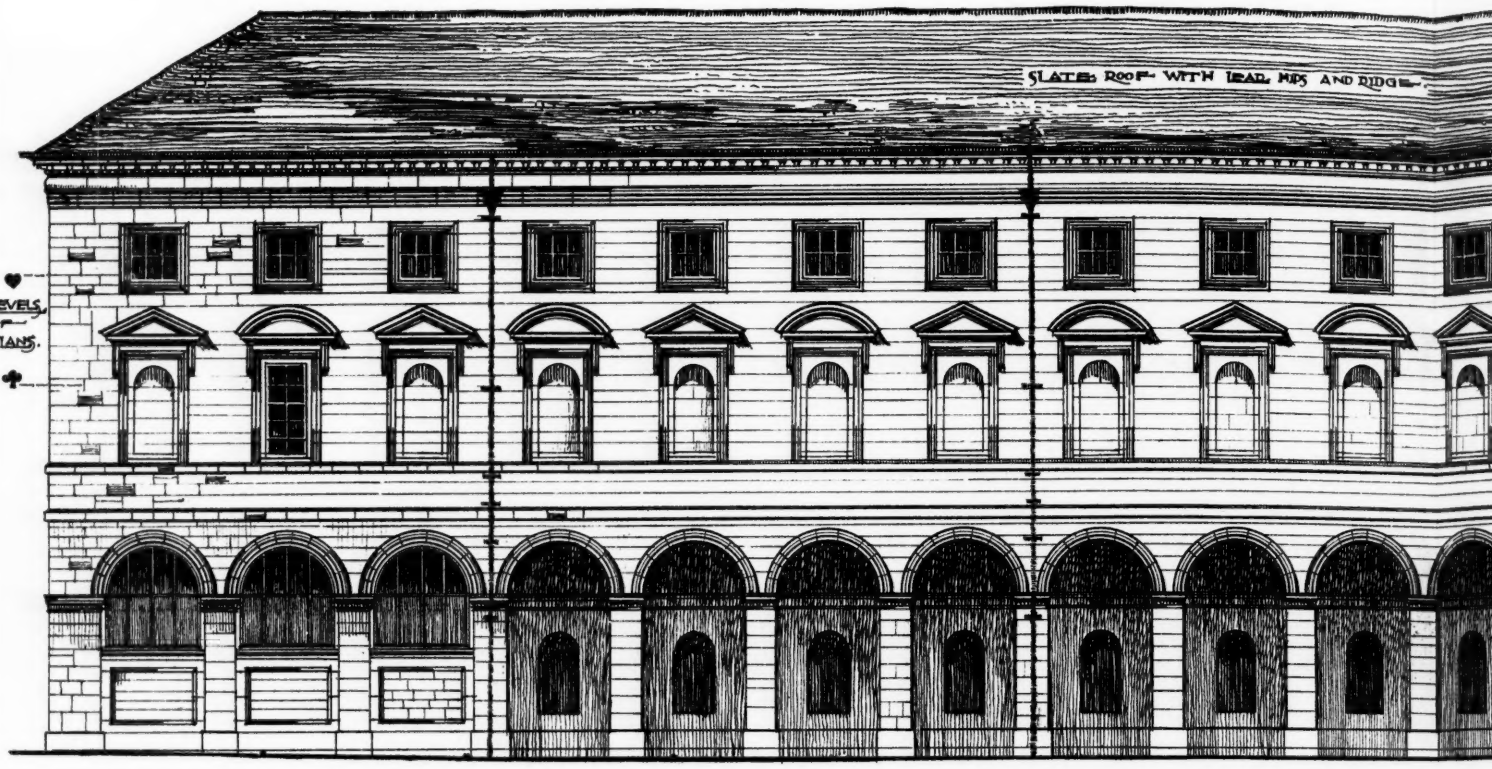
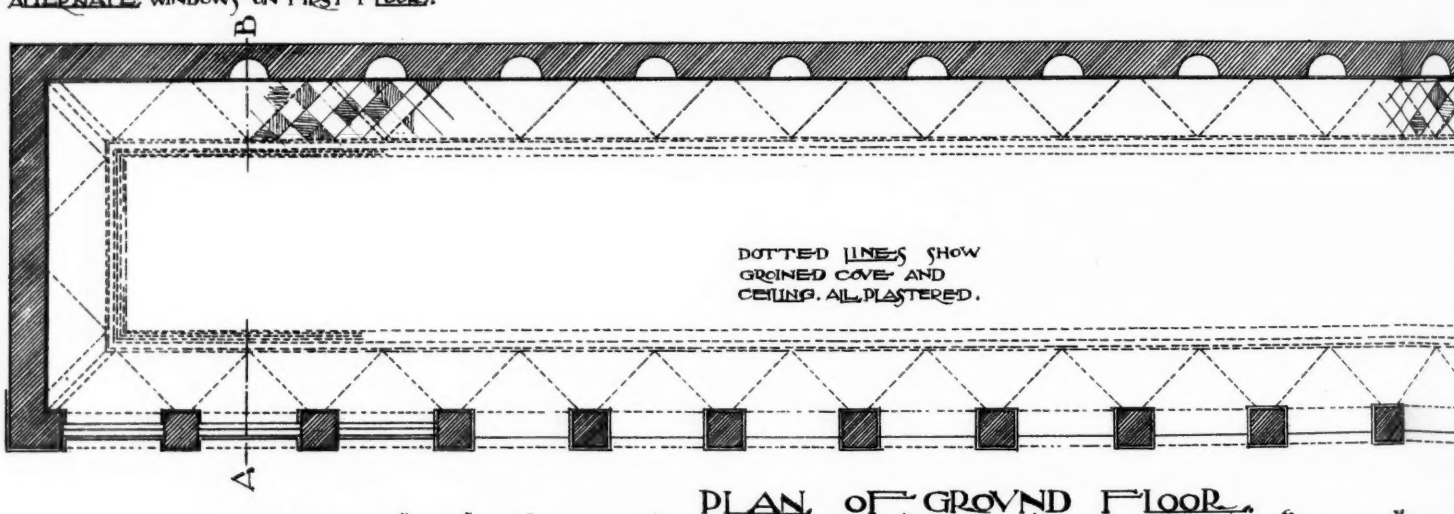
THE WESTMINSTER DORMITORY.

PLANS. ELEVATIONS AND SECTIONS OF THE BUILDING AS ORIGINALLY EXECUTE



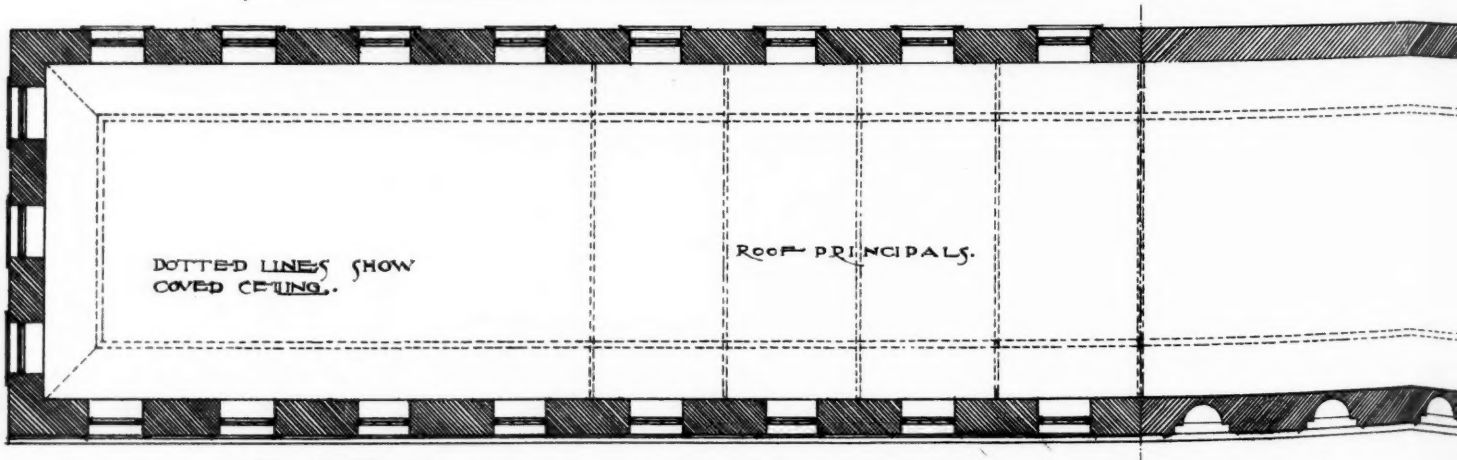
IN THESE THREE BAYS IS SHEWN THE EXISTING FILLING IN TO ARCADE AND ALTERNATE WINDOWS ON FIRST FLOOR.

ELEVATION OF PRINCIPAL FACADE.



SCALE OF 0 5 9 10 20 30 40 50 60 70

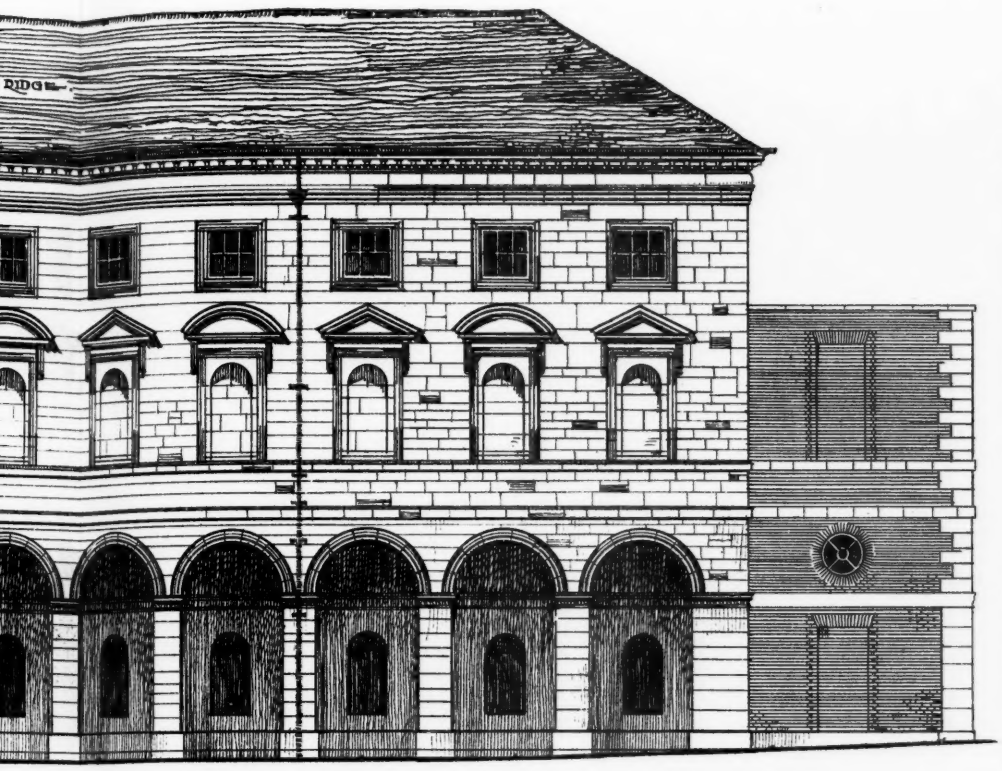
PLAN OF GROUND FLOOR.

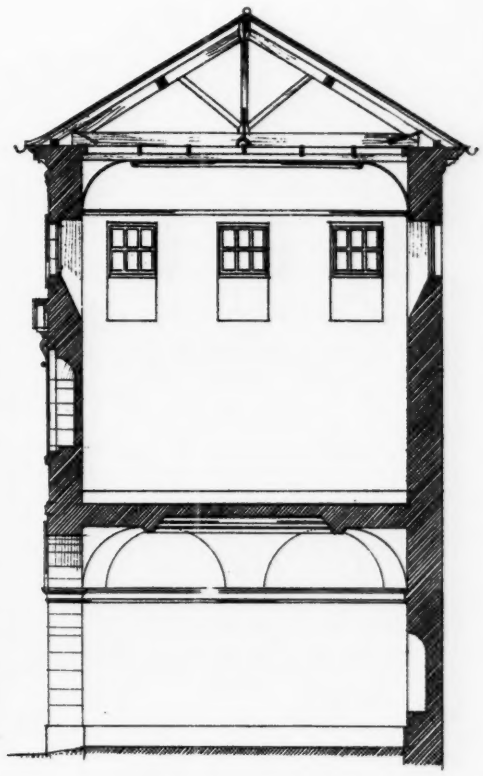


AT LEVEL ♥.

PLAN OF FIRST FLOOR.

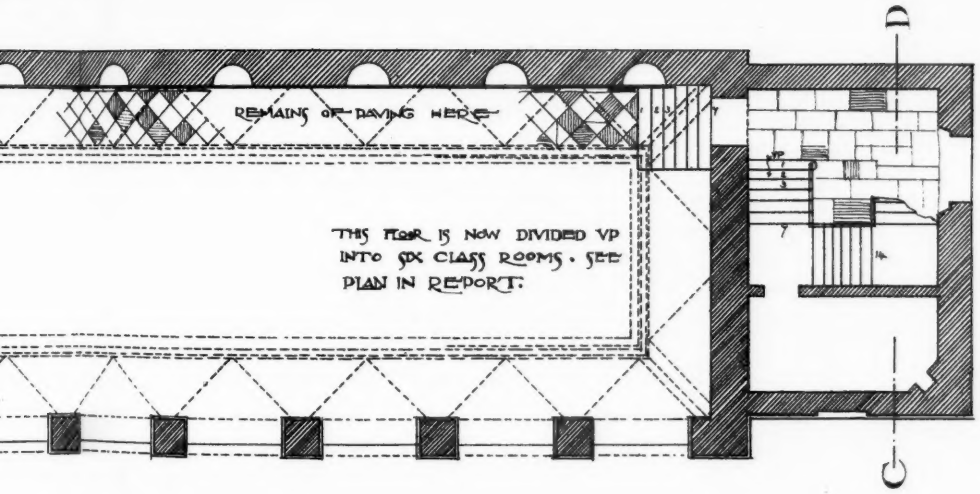
EXECVTED.

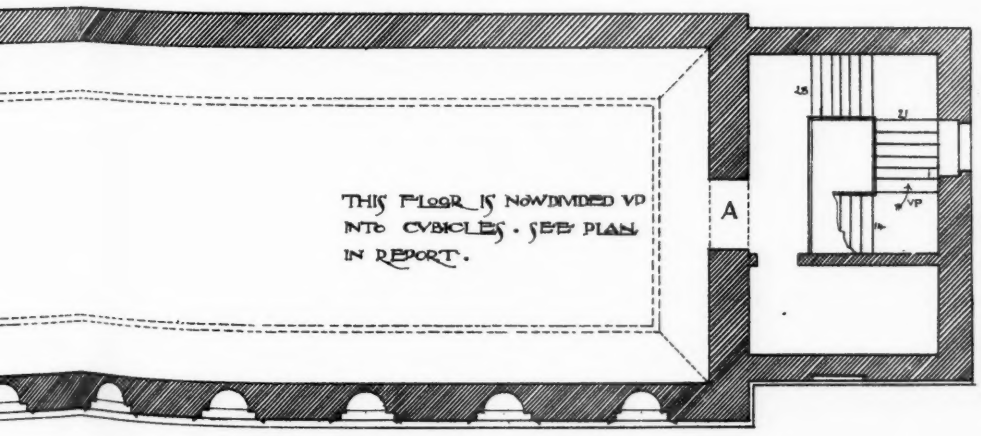




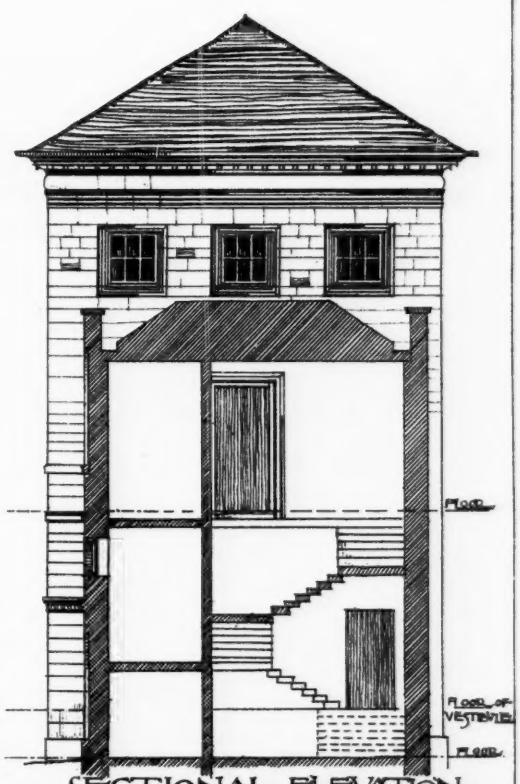
TRANSVERSE SECTION
ON THE LINE A-B

ADE.





AT LEVEL ♣.



SECTIONAL ELEVATION
ON THE LINE C-D.

ARTHUR STRATTON.
MEM^S ET DELL 1900-1901.

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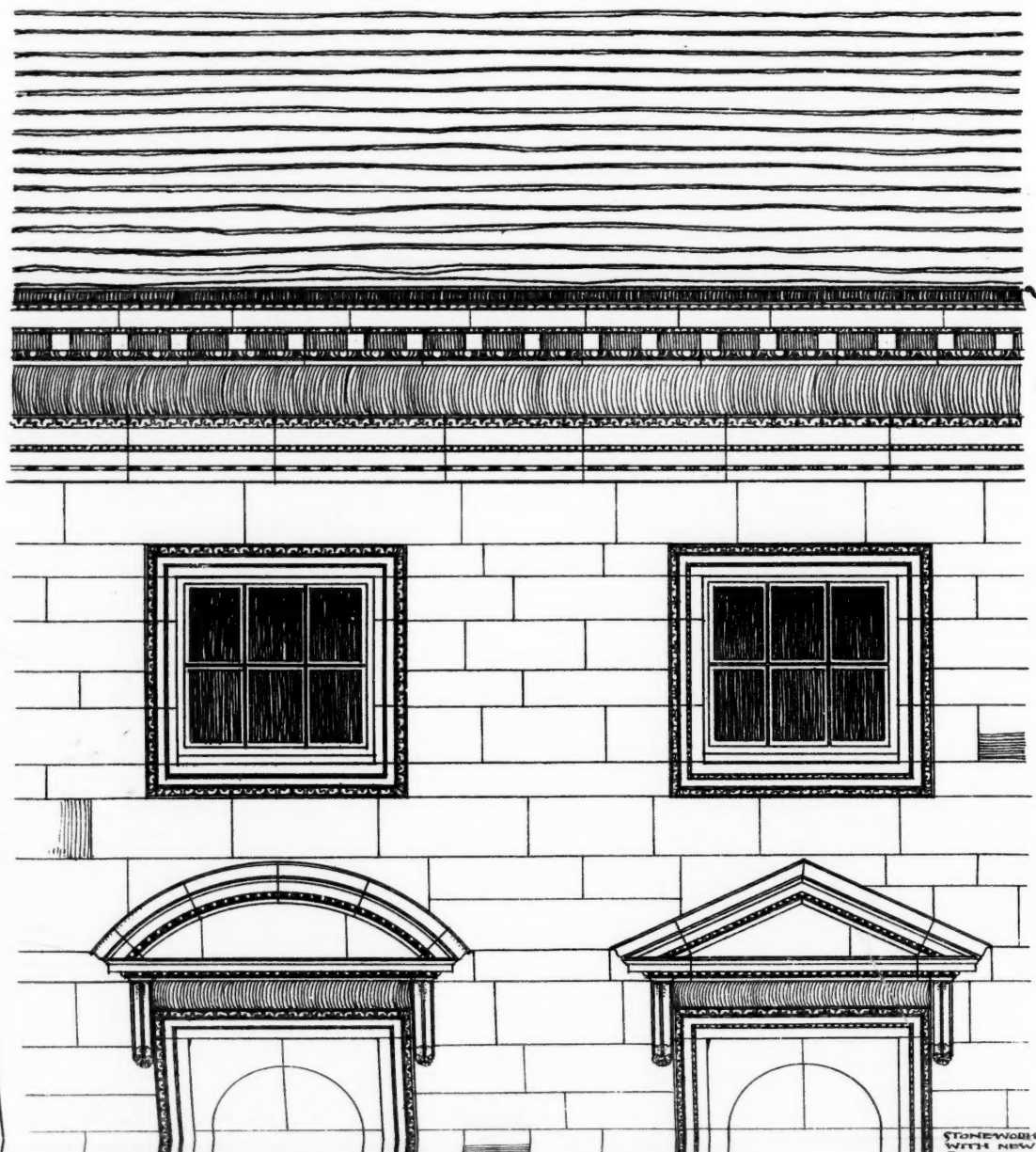
THE WESTMINSTER DORMITORY.

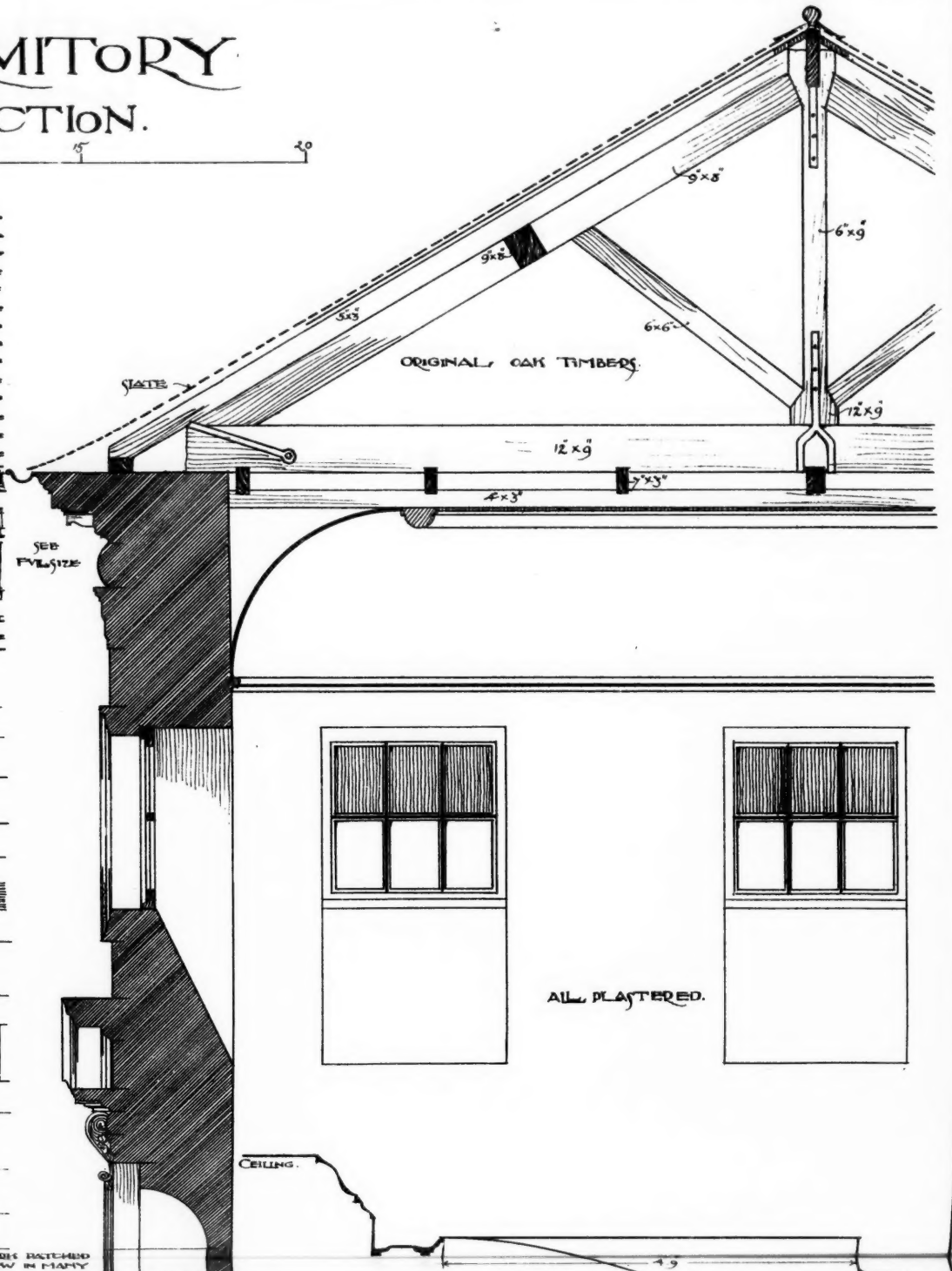
DETAIL OF PART ELEVATION AND SECTION.

SCALE OF FEET.



STONEWORK PATCHED WITH NEW IN MANY PLACES.

SEE FULL SIZE



STONEWORK PATCHED WITH NEW IN MANY PLACES.

PLAN OF NICHE

LEAD

DETAIL OF GROINED COVE BELOW.

FLOOR

PLASTER MOULD BELOW COVE AS SAME AS STONE IMPOST TO PIERS BUT NOT ENRICHED.

ARTHUR STRATTON.
MENS ET DEXT. 1900-01.

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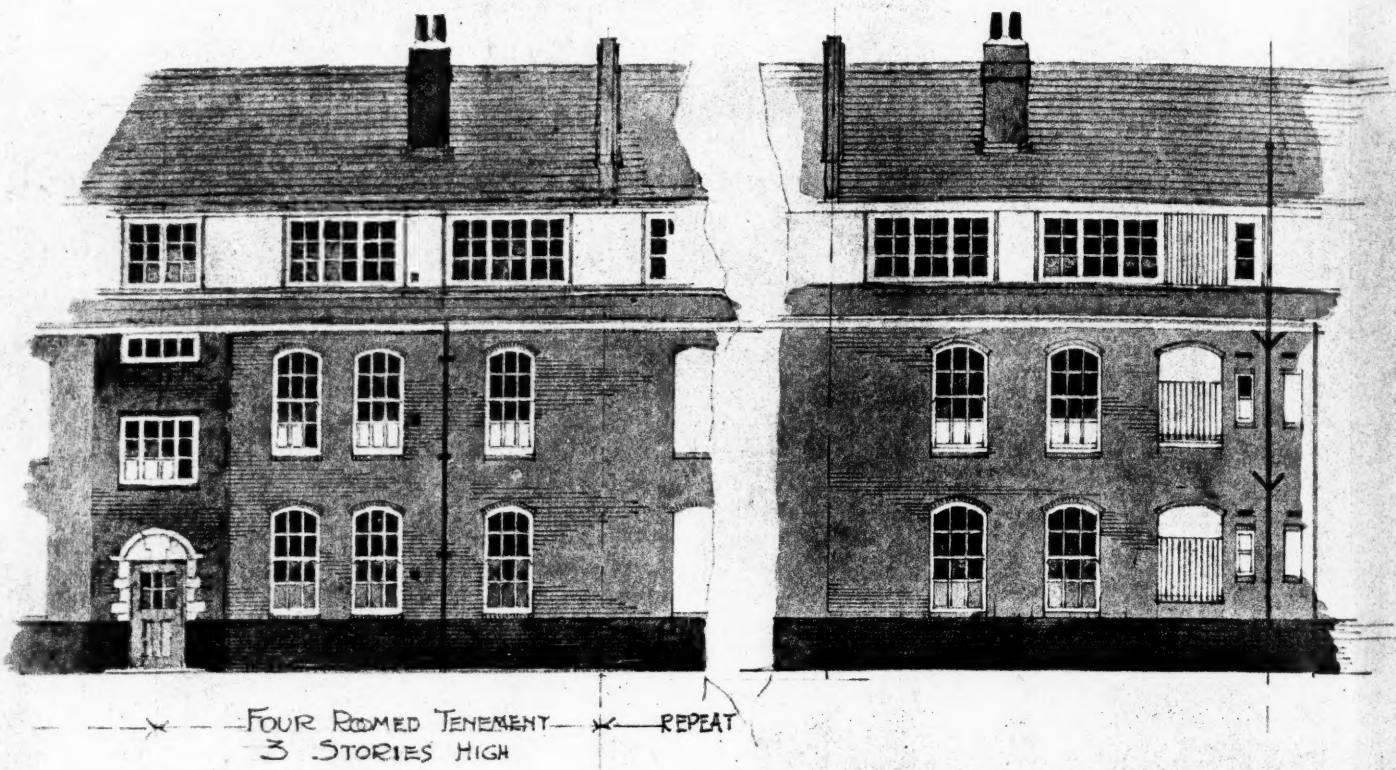
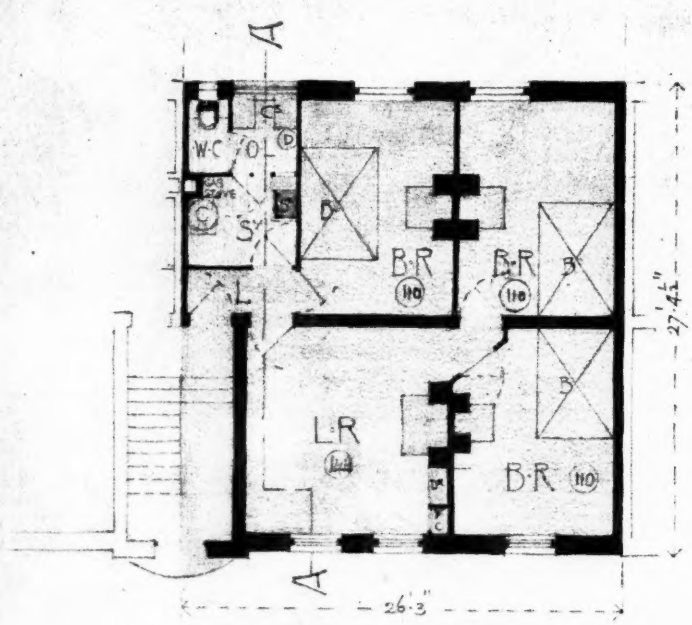
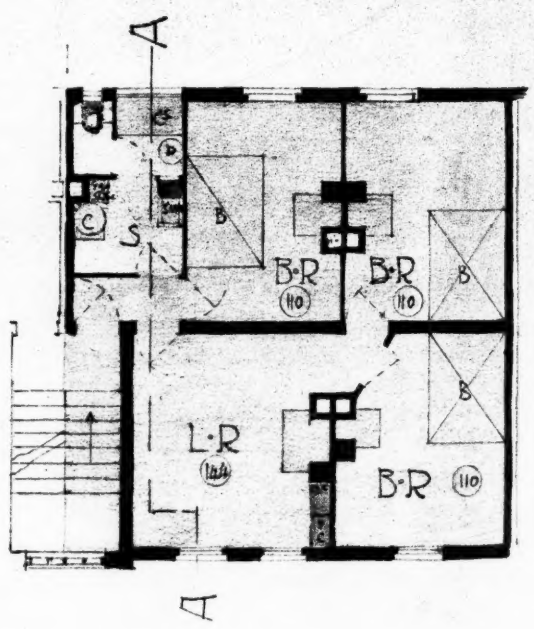


·FRONT ELEVATION·

·BACK·ELEVATION·



·GROUND·FLOOR·PLAN·

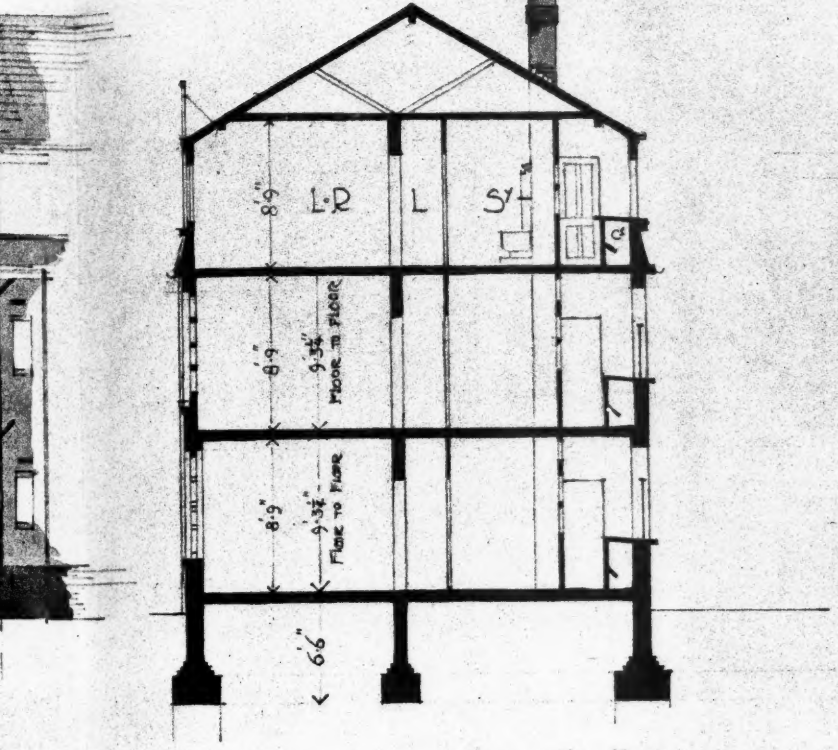


·FIRST·FLOOR·PLAN·

SCALE OF 10 5 0 10 20 30

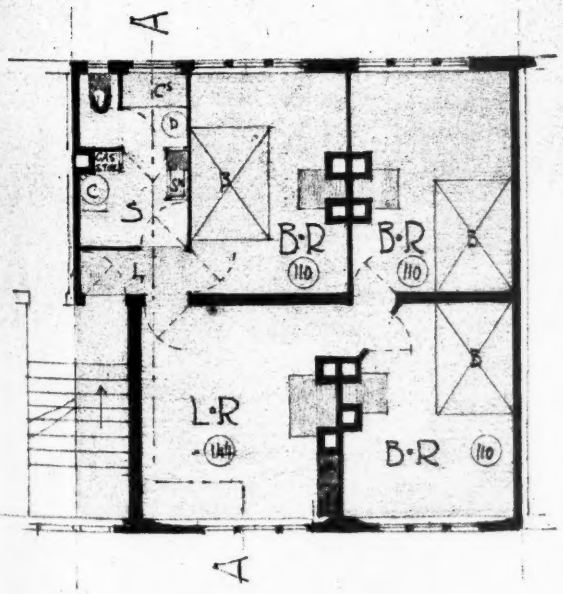
BATTERSEA WORKING-CLASS HOUSES COMPETITION. No

MESSRS. SMITH & WEALD

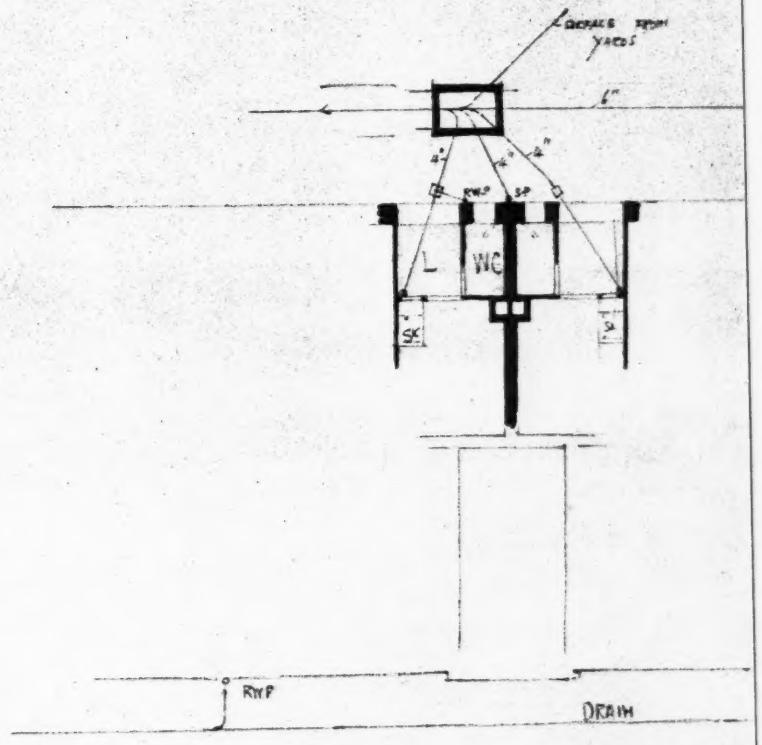


·SECTION A·A·

· L·R DENOTES · LIVING ROOM ·
· B·R " · BED " ·
· SY " · SCULLERY ·
· SK " · SINK ·
· C " · COPPER ·
· D " · DUST ·
· C^{s} " · COALS ·
· L " · LOBBY ·
· F·C " · FOOD CUPBOARD
· B " · BED
(110) " {FLOOR AREA IN SUPERFICIAL FEET}



·SECOND·FLOOR·PLAN·



·DRAINAGE·PLAN·

30 40 50 60 FEET

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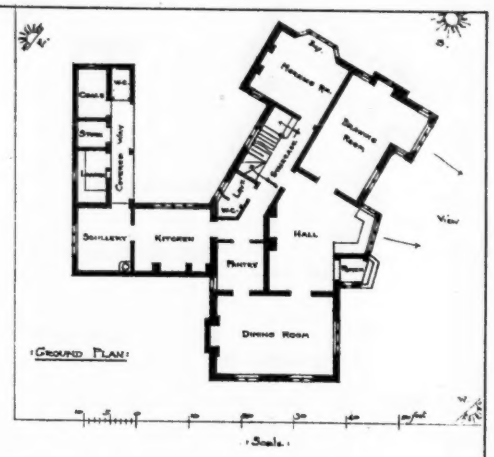

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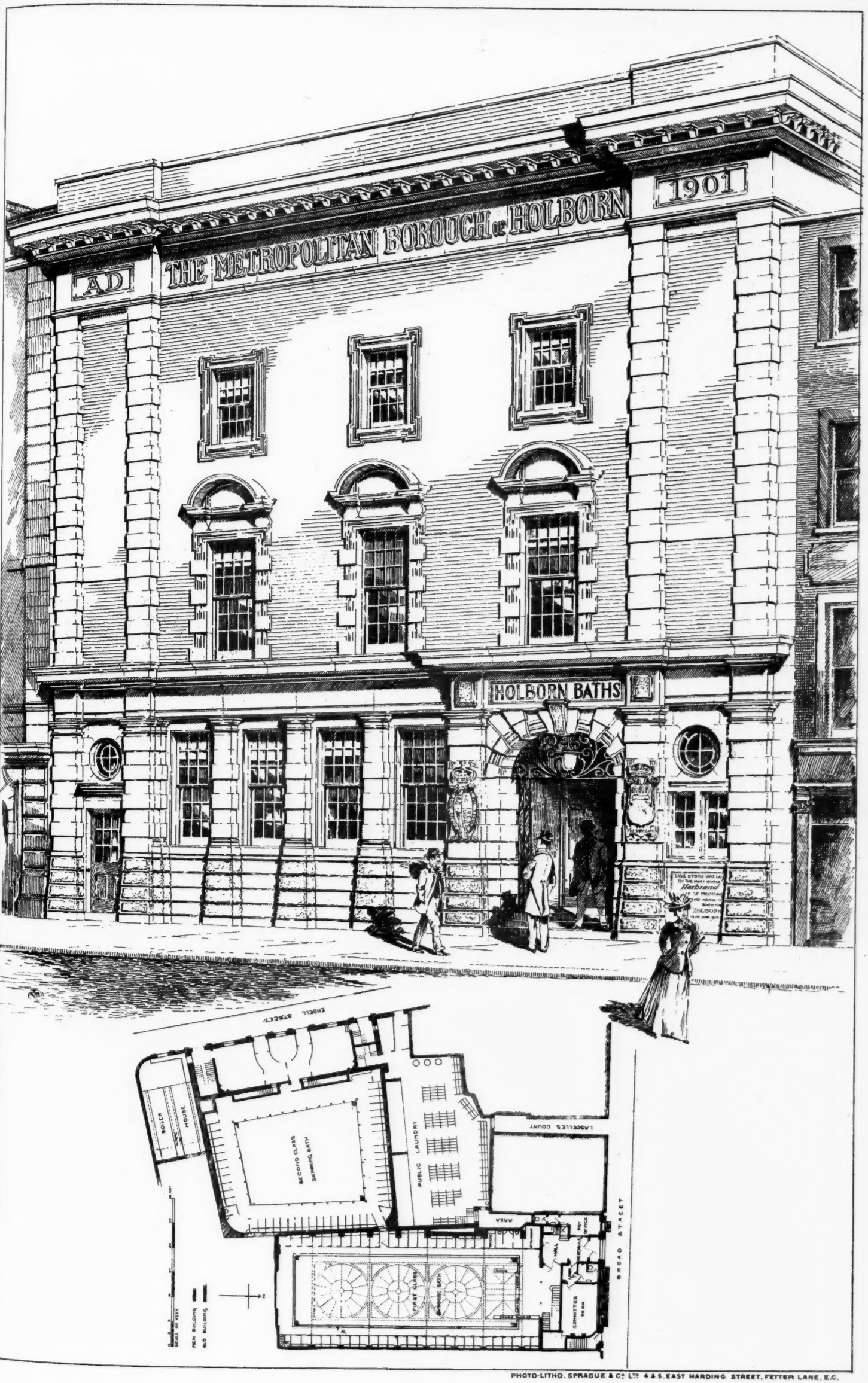

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